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# PRIMER OF COSTING

AN INTRODUCTION TO THE SCIENCE  
OF COST ACCOUNTANCY

BY

R. J. H. RYALL

FELLOW OF THE INSTITUTE OF COST AND WORKS ACCOUNTANTS  
AND MEMBER OF THE NATIONAL ASSOCIATION OF  
COST ACCOUNTANTS, NEW YORK



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## PREFACE

COST accountancy has made such rapid strides during the past ten years that the excellent prospects which are now offered by this comparatively new profession have opened up a very wide field of opportunities for the young man and woman of to-day

Much literature already exists which deals with the subject of cost accountancy, chiefly for the benefit of those who are already engaged in the profession, and which, consequently, is far too advanced to be of real assistance to those who wish to take the first step towards qualifying as cost accountants

Furthermore, the training of a cost clerk has unfortunately been regarded as of little relative importance compared to that of the cost accountant. As a consequence, those wishing to enter a cost office as a means of livelihood are more or less without easy means of acquiring an elementary knowledge of the subject

The recently instituted costing examination of the Royal Society of Arts should go far to remedy this defect, and it is hoped that this book may be of some service to students who intend to present themselves for this examination, as well as for students of the various professional bodies

The object of this book, therefore, is, firstly, to enable the beginner to obtain a thorough knowledge and understanding of the elementary principles of costing and to give brief descriptions of the various methods used in practice, and, secondly, to enlarge upon these elementary principles in such a manner as will indicate in a general way to the more advanced student how such methods and principles can be applied

In dealing with the subject it is necessary to pre-suppose a knowledge of the principles of book-keeping and accounts

Grateful acknowledgment is made by the author for the assistance given by Mr H J Fells, B A , in reading and correcting the proofs during preparation

R J H RYALL

LONDON, W C 1

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# PRIMER OF COSTING

## CHAPTER I

### INTRODUCTORY

MUCH misapprehension exists as to what cost accountancy really involves or achieves, and it is therefore desirable to understand clearly the sphere of costing, and how, and to what extent, it differs from ordinary book-keeping and accounts

It is obvious that when men engage in business they do so in order to obtain a profit. The more simple method of trading is that of merchanting, where a man buys ready-made goods from the makers or their agents and sells them at a higher price in order to make his activity profitable. The method, under normal circumstances, of guaranteeing himself such a profit is simple, as the actual business routine is not complicated, and the cost of such routine can easily be calculated.

Let us now consider a system of financial accounting in so far as the ordinary routine of business is concerned, and assume for the sake of illustration that a trader is engaged in buying ready-made suits for the purpose of sale. In such cases, a system of book-keeping and accounts will correctly record the trader's dealings with his creditors, his debtors, and his bank. It will also enable him to ascertain what money is owing to him or what he owes to his creditors, the total amount of profit made at the end of a trading period, and the amount of capital employed in his business, and numerous other figures relating to his financial or external transactions.

It may be, however, that the trader decides that it would be more profitable to manufacture all or most of

his lines, and it becomes necessary for him to rent a building or acquire a piece of land on which to build his works. He will then have to buy cloth to work up into garments, and, in addition to this, a stock of buttons, cottons, linings, stiffenings, braid, and other miscellaneous materials must be kept, and a supply of needles, chalk, pins, etc., must also be available. Paper, tape, boxes, brown paper, string, and labels, all described as packing materials, become necessary.

Labour must next be hired to work the cloth into the finished product, and, in addition, there will be required cutters, who will cut out the material to the correct shape and size, pressers, who press the finished garment, a storekeeper, to look after the stock of materials, mechanics, who will attend to the machines, also sweepers, and numerous other kinds of sundry labour.

A factory manager is essential, to whom the foremen, the warehousemen, and the storekeeper will be responsible.

Plant and machinery must be paid for, also charges for gas, electric light and power, fuel for heating, and many other items of expense. Buildings and machinery will require repairs and renewals, and reserves must be made for depreciation.

It will now be seen that, with all these additional activities, there will be a corresponding increase in the number of financial transactions, and that a system of financial accountancy will require to be arranged to accommodate these changed conditions.

Financial accountancy, however, has developed along scientific lines, so that to-day a manufacturer is as well provided as the merchant with all the information he requires, on the purely financial side of his business. But, a system of accounts which deals only with the external transactions of a business will not meet all the requirements of a manufacturing concern, and, in order to show this, it is desirable to examine briefly the various accounts

prepared from such a system at the end of a financial period

Before such final accounts can be prepared, a trial balance is first extracted from the ledgers. A Manufacturing and Trading and Profit and Loss Account must

## TRIAL BALANCE

AS AT 31ST DECEMBER, 19—

		Dr	Cr
£		£	£
3,000	Stock, 1st January	3,000	
7,500	Purchases (materials)	7,500	
9,200	Wages	9,200	
	Salaries	1,500	
	Stationery	250	
	Rent and rates	475	
	Depreciation—		
	Plant and machinery	210	
	Buildings	100	
	Carnage	50	
	Insurance	175	
	Gas	240	
	Electricity	210	
	Water	75	
6,900	Travelling expenses	300	
	Directors' fees	525	
	Commissions	310	
	Royalties	600	
	Advertising	700	
	Debenture interest	250	
	Discounts	200	
	Bank interest	95	
	General expenses	275	
	Patent fees	50	
	Catalogues	310	
	Sundry debtors	4,500	
	Bills receivable	1,700	
	Land and buildings	5,500	
	Plant and machinery	39,400	
	Furniture and fittings	2,360	
	Cash at bank and in hand	790	
	Sales (less returns)		27,100
	Share capital account		48,000
	Sundry creditors		4,000
	Bills payable		1,500
	Bad debts reserve		250
<u>£26,600</u>		<u>£80,850</u>	<u>£80,850</u>

Stock, 31st December, £2,500

then be prepared, and finally a Balance Sheet is drawn up. The extent of this drawing up will naturally depend upon the size and nature of the business, but the example of the accounts referred to will be sufficient for our purpose.

### TRADING AND PROFIT AND LOSS ACCOUNT

*Dr* FOR YEAR ENDING 31ST DECEMBER, 19— *Cr*

1st Jan	To Stock	£ 3,000	31st Dec	By Sales	£
31st Dec	" Purchases	7,500		(less returns)	27,100
	" Wages	9,200	"	" Stock	2,500
	" Gross profit c/d	9,900			
		<u>£29,600</u>			<u>£29,600</u>
		£		By Gross profit b/d	£ 9,900
	Salaries	1,500			
	Stationery	250			
	Rent and rates	475			
	Depreciation	310			
	Carriage	50			
	Insurance	175			
	Gas	240			
	Electricity	210			
	Water	75			
	Travelling expenses	300			
	Directors' fees	525			
	Commissions	310			
	Royalties	600			
	Advertising	700			
	Debenture interest	250			
	Discounts	200			
	Bank interest	95			
	General expenses	275			
	Patent fees	50			
	Catalogues	310			
	Net profit	3,000			
		<u>£9,900</u>			<u>£9,900</u>

### BALANCE SHEET

AS AT 31ST DECEMBER, 19—

<i>Liabilities</i>	£	<i>Assets</i>	£
Bills payable	1,500	Cash at bank, etc	790
Sundry creditors	4,000	Bills receivable	1,700
Paid-up capital	48,000	Sundry debtors £4,500	
Profit and loss A/c	3,000	Less reserve for bad debts 250	
			<u>4,250</u>
		Stocks on hand	2,500
		Land and buildings	5,500
		Plant and machinery	39,400
		Furniture and fittings	2,360
	<u>£56,500</u>		<u>£56,500</u>

The preceding accounts, when drawn up and arranged in sufficient detail to meet the particular requirements of the individual business, provide the manufacturer or trader with all the information he requires regarding the general finances of his business, but they are of very little value in the control of a manufacturing business, as such accounts do not show the cost of any particular stage in the manufacture of the final product, nor where in such stages there is any profit or loss. Moreover, they do not permit prompt comparison of the estimated with the actual cost of manufacturing. They give no clue as to how far time or material are efficiently utilized, or where waste is rampant and economies possible. To ascertain the cost of a single article, process, or batch of articles it becomes necessary to analyse the expenditure directly involved in their manufacture in such a manner as will show not only the elements which constitute a complete cost, but also various other data relating to the many activities of the factory.

### **Objects and Advantages of Costing**

If a system of cost accountancy is to be of any real value to the manufacturer, it must be far more than a mere branch of ordinary financial accounting. Ordinary accounting deals with the *external* transactions of a business from a purely financial point of view, and in all cases in bulk and in terms of cash, whereas cost accountancy deals with the *internal* transactions and from the point of view of manufacture and distribution.

A costing system must accommodate many other problems besides purely monetary values. It must deal in terms of efficiency, time, weight, volume, etc., and connect the manufacturing operations with the financial transactions by interpreting the former in terms of cash.

The objects of costing may, therefore, be stated as—

(1) To determine the actual cost of each article, process, or operation

- (2) To compare the actual cost with the estimate
- (3) To provide statistical data in the form of reports and statistics, so that a factory can be managed on the basis of facts
- (4) To reconcile with the financial accounts in terms of true cost the expenditure incurred and charge it to production, distribution, and management

The advantages derived from the use of a good costing system are—

- (1) The amount of profit or loss on the manufacture and sale of different products can be ascertained and localized
- (2) By making it possible to compare the actual cost with the estimate, it enables future estimates to be prepared with more reliance, and provides a sound basis for establishing sales policies and prices
- (3) The management of a business is aided by the information made available by a good system of costing, as the efficiency of each department can be examined and compared with that of others
- (4) The provision of accurate and detailed costs enables the business to be managed and controlled efficiently, as excessive costs, waste, and unremunerative expenses can easily be detected and eliminated

Three clearly defined branches of cost accountancy have now been indicated, namely—

- (1) **COST FINDING**, which relates to the method used to ascertain the detailed and total cost of any desired article, process, or service
- (2) **COST CONTROL**, which provides, firstly, the means of controlling in detail and total all expenditure incurred in connection with production, distribution, and management, and, secondly, the basis for reconciling the total cost with the financial accounts
- (3) **COST ESTIMATING** is the predetermination of the probable cost of an article, process, or service when incurred under given conditions

## Methods of Cost Finding

The particular method of cost finding used depends upon the nature of the industry and the class of product made. The output has to be measured and the mode of measurement depends absolutely on the form of the product and its method of manufacture. The cost of the output may have to be reckoned by the piece, pound, dozen, barrel, yard, article, etc., and by taking one of these classifications and using arithmetical figures, the total can be obtained. In some trades the unit might be the article or batch of articles produced, a piece of machinery, a complete job or order, as in an engineering works or a general repair shop, and, in some cases, in foundries. The unit in the case of builders or contractors would be the completed job or contract. An electric supply company would require the Board of Trade unit or kilowatt hour.

In other trades the unit may be related to the "process," as with chemicals, tanning of leather, flour, bricks, and cement, etc.

Various methods of cost finding are used in practice, but these may be conveniently grouped under three main headings, i.e.—

- (1) Job costing
- (2) Process costing
- (3) Operative undertaking costing

(1) **JOB COSTING**, which is very often referred to as the order method, is used when all the various items are charged to a specific order, which may be for one or a quantity of articles or for a particular operation.

With this method, the amount expended on labour and materials is charged to a particular order number, together with its share of expenses, and the sum total constitutes the cost of the job, order, or operation.

(2) **PROCESS COSTING** is employed in cases where there is a variety of processes or operations before a completed product is turned out, and where it is necessary to find



the cost of each variety of operation. This method is particularly necessary where by-products naturally occur, or where one article out of a batch loses its identity during the process of manufacture. By this method comparison of the costs of different operations is possible, and prices at each stage can be fixed. Process costing is used in most food producing factories, chemical works, and in the manufacture of paint, etc.

(3) **OPERATIVE UNDERTAKING COSTING** is the essential method where services are rendered rather than goods produced. A single measurement demonstrates the work performed, though it may vary in kind, as when a railway company reckons work performed as per ton mile or per passenger mile, etc., or an electric supply company per Board of Trade unit or kilowatt hour. Operative costs render possible the costing of transport undertakings and other public utility concerns, such as water works and gas works.

Many other terms are often used to denote a method of costing, but all of them relate to one of the above. For instance, **SINGLE or OUTPUT COSTING** is a term often used to denote the method of costing employed in such businesses as supply one rather than many products, and where it is desired to find the actual or average cost of one unit, weight, measurement, or container, as per ton, per yard, per 1,000 bricks, or per sack of flour.

Such a term, however, merely refers to the job or process method of costing. Most manufacturing businesses use either the job or process method, or a combination of the two, when departmentalization or a division into processes is usual or desirable.

**DEPARTMENTAL COSTING** is a term used when it is desired to ascertain the cost of the output of each department separately when a standard article or process only is made. The method used in such cases is also the job or process, or a combination of the two.

**TERMINAL COSTING** refers to the ascertainment of the cost of carrying out a contract such as the erection of buildings, bridges, or irrigation schemes, etc. This method of costing is the same as the job costing system.

**MULTIPLE COSTING** relates to the system used in such businesses as make a variety of goods which differ both in value, in kind, and in the number or variety of processes necessary for completion. These accounts are based on the job costing method.

### **Elements of Cost.**

To employ any of the above methods of costing it is necessary that money expended be analysed according to its use. This analysis firstly takes the form of segregating expenditure under the heads of—

- (1) Materials
- (2) Labour
- (3) Expenses

Such are known as elements of cost, and the sum of these elements comprises the total cost. The grouping of these elements has been indicated by inserting on the left-hand side of the specimen trial balance the totals of the respective groups.

### **Relation Between Cost Accounts and Financial Accounts**

It has already been stated that one of the objects of costing is to reconcile with the financial accounts in terms of true cost the expenditure incurred and charged to production, distribution, and management. It is therefore necessary that a suitable method of reconciliation and control of each element of cost be used. This is effected by means of "control accounts," which are accounts that coincide with the three divisions mentioned above. The Chart (Fig. 1) clearly illustrates the connection between the three cost control accounts, representing the three

elements of cost, and the source from which the figures are obtained in the financial books of account

### **Costing Terms**

To render the subject clear and explicit, it is desirable at this point to define the more usual terms employed in costing. Costing terminology has been so loosely applied in the past that considerable difficulty often exists when it is necessary to define a particular term.

For instance, the word **COST** is very frequently used, and it may refer to the cost of manufacturing only, or the cost of selling and distributing the goods, or it may be used to indicate the total cost of manufacturing, selling, and distribution. Owing, therefore, to the very wide interpretation placed upon this word, it should never be employed unless qualified in some particular way.

Many other terms are given an equally wide meaning, such as **ONCOST**, **OVERHEADS**, **BURDEN**, etc., but all of these relate to one particular element in costs. Such terms do not indicate the nature of the item in question, and it is recommended that the term **ESTABLISHMENT EXPENSE** should therefore always be used.

**TOTAL COST** is the sum of all items of expenditure incurred to produce, manufacture, and distribute any commodity, or to render a service.

**WORKS COST** is the sum of all items of expenditure incurred in the manufacture or production of any commodity, i.e. the works cost of materials, labour, and expense. (Cost of production and factory cost is sometimes used when referring to works cost.)

**PRIME COST** is a part of the works cost and comprises direct materials and direct labour only.

**ESTABLISHMENT EXPENSE** is the term used to denote all the indirect expenses incurred in running a business both in the works, offices, branches, and other commercial departments, etc.

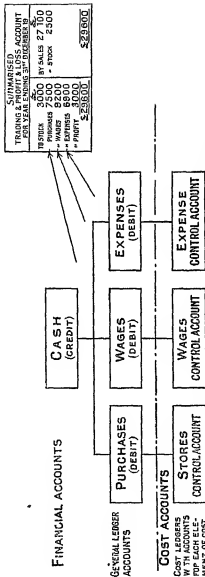


Fig 1 — Illustrating the connection between the three Cost Control Accounts, representing\* the three elements of cost and the source from which the figures are obtained from the financial books of accounts

WORKS EXPENSE is a sub-division of establishment expense, and is the term used when referring to all items of expense which have been incurred in the works proper

SALES EXPENSE is the term used when referring to all the expenses incurred in connection with the selling and distribution of a firm's products. Sales expense is also a sub-division of establishment expense.

CHART SHOWING COMPONENTS OF TOTAL COST  
AND SELLING PRICE

$$\begin{array}{rcl}
 \text{Direct Materials} & \left. \begin{array}{c} \\ \\ \end{array} \right\} = \text{Prime Cost} & \\
 \text{Direct Wages} & \left. \begin{array}{c} \\ + \\ \end{array} \right\} & \\
 & \text{Works Expenses} & \left. \begin{array}{c} \\ + \\ \end{array} \right\} = \text{Works Cost} \\
 & \text{Sales Expenses} & \left. \begin{array}{c} \\ + \\ \end{array} \right\} = \text{Total Cost} \\
 & \text{Profit (or Margin)} & \left. \begin{array}{c} \\ + \\ \end{array} \right\} = \text{Selling Price}
 \end{array}$$

## CHAPTER II

### HOW A COSTING SYSTEM WORKS

CONSIDER in the first place a business which may be making and selling, say, a line of six or more articles, and whose ordinary financial accounts show the results of its trading in total

If the nature of the business is such that there are six separate departments, and each department is self-contained and only makes one of the articles referred to, then a system of book-keeping and accounts could be arranged to give a separate manufacturing and trading account for each department. In this special and exceptional instance, it would be possible for the manufacturer to ascertain the amount of profit made on each line or department and to regulate his selling prices whenever it became necessary to meet competition. It will be seen, however, that under these special conditions the selling price could only be adjusted so long as there was a sufficient difference between the total cost and the selling price. If this margin is found to be insufficient, according to the knowledge of total expenditure which his present accountancy system gives him, but prices must be reduced in order to create or maintain a market, it becomes necessary to employ a system of cost accountancy in order that the manufacturer shall know *where* and *how* costs can be reduced on each item.

To know the total cost of an article in such a case will not be sufficient, because it will not indicate which item of cost is excessive or where waste is prevalent. A manufacturer, therefore, must know not only how much he has spent on materials and wages, but must be informed of

the values of each class of material used, the extent of scrapped or spilt work, and the various kinds of labour used in making the article, as without such information he cannot decide whether the use of cheaper materials is possible or a change in the method of making is more economical, or if costs can be reduced by changing or modifying the existing designs

### Requirements of Modern Industry.

It would appear from the above that a system of cost accountancy to meet all his requirements will be of a very complicated and difficult character, but as the working of an accurate system can be an example of simplicity itself and still provide the manufacturer with all the information he requires, we will briefly examine such a system in order to demonstrate how a costing system can fulfil the requirements of modern industry

Continuing with the class of business already given in Chapter I, let us assume that the manufacturing concern is making "ready-made" clothing. Such a firm will probably make its seasonal "stock" lines—it may also manufacture specially designed garments for special orders or for export, and it may also be necessary to make up sample garments to try out new markets or to enable a factor to put a new line on the market.

The requirements of such a business in regard to its internal organization would be similar to that already described in the previous chapter, and all payments for materials, labour, salaries, and other charges could, as was shown in the specimen account on page 4, be charged *en bloc* against the total sales for the period.

It is true that such a total of debits would give us the total cost of the business for a year, but it has already been pointed out that such information is quite inadequate for a manufacturing concern. Let us, then, see how a costing system works to make good the deficiencies

## Manufacturing and Stock Orders.

It follows from the description of the trade done that it is necessary to identify the different batches of work going through the factory. There will be STOCK ORDERS, or orders for quantities convenient to control (i.e. as large a quantity as it is economical to make in one batch, if too large, production drags on too long and control is lost, if too small, the workman does not get a good "run" on the work). These stock orders refer to ordinary lines.

There will also be manufacturing orders (generally known as WORKS ORDERS) corresponding to the customers' orders received. There should be one such order for every *kind* of garment ordered, thus the customer's order received may be split up into items delivered "*ex stock*," and items to be made up specially.

## Issues of Materials.

As soon as the works order is sent into the factory, the cutting room estimates the quantity of cloth required on an Issue Note (the term "Issue Note" is chosen to describe that particular form of requisition which authorizes the issue of materials from stores for production).

The storekeeper who looks after the cloth does not cut off the actual amount required, but issues a "piece". On the Issue Note is recorded the works order number for which the cloth is required. The cutters lay the pattern on the cloth and cut out the garment, and then mark on the Issue Note the actual quantity of material used. The remainder of the "piece" is then returned to the storekeeper, together with the Issue Note.

## Recording Labour.

Meanwhile the time which the cutters have spent is recorded on a TIME CARD, or Time Sheet, which will also have inserted upon it the works order number.



The cut garments are then passed to the makers with a **PIECE WORK NOTE** written out by the foreman's clerk, stating how much will be paid for the work to be done. Again the works order number is quoted. At the same time the foreman selects the buttons, etc., from the small stock which he keeps under his own control, the issues from stores in bulk being charged to his department and not to the separate works orders. When the work is done the foreman signs the Piece Work Notes and Time Cards and sends them to the pay office, so that the men's pay can be made up.

The clerk makes out a **DELIVERY NOTE**, and this goes with the garments to the warehouse. Here the works order number enables reference to be made to the customer's or stock order, and the warehousemen dispose of the goods accordingly. Some of the batch will probably be put into stock and recorded on **BIN CARDS**, and some will be sent straight away to a customer.

### **Function of Cost Finding.**

Let us now see how the function of *Cost Finding* is performed.

(1) All the Issue Notes referring to the works order are collected. They form the voucher for crediting the Stock Account (i.e. the stores) with the value of materials issued and debited against the works order.

(2) All the Time Cards and Piece Work Notes bearing the works order number are collected. They form the vouchers for crediting the Wages Account in the Cost Ledgers and debiting the works order with the labour cost.

(3) An estimate, prepared by the works manager's department, of the buttons, cotton, stiffenings, etc., used on a single garment is used as a basis for charging the total cost of the "indirect materials" used on the works order. This will form the basis for crediting the department which made the goods with the value of the indirect

materials used thereon (they having been debited with the bulk issued, which, in turn, was credited to Stock Account in the Cost Ledger), and debiting the works order

(4) A charge is made, based upon some logical method, to cover the expenses incurred, other than those under (1), (2), and (3) This charge is a debit to the works order and a credit to the Expense Account in the Cost Ledger

(5) By adding the debits made under (1), (2), (3), and (4), the works cost of the batch of garments made to that works order is "found," but "cost finding" has other work to do We must find the correct figure for the "charge" to be made under (4)

(6) This is done by estimating the normal total of all the indirect expenses (i.e. the establishment expense) for the year, and by dividing this total by a divisor based upon the output which corresponds to the "normal" output of the factory This divisor may be the number of garments made or the total direct labour costs for the year, or the total productive hours for the year Whichever method is used, the quotient is the basis for making the charge required, (4) This particular work is perhaps the most difficult of the cost department

(7) The cost in the warehouse of the packing must also be "found," similarly to (6), and we thus arrive at a charge for packing which must be added to the total works cost to find the profit on a sale

(8) Similarly, the cost of the indirect labour must be "found" by using what is known as "standing" orders, and by collecting the Time Cards for these, we have now another credit to the Wages Account in the Cost Ledgers and a debit to the (Establishment) Expense Account also in the Cost Ledger

### **Function of Cost Control.**

We now enter the domain of *Cost Control*

(9) By summarizing our issues of materials we are in a

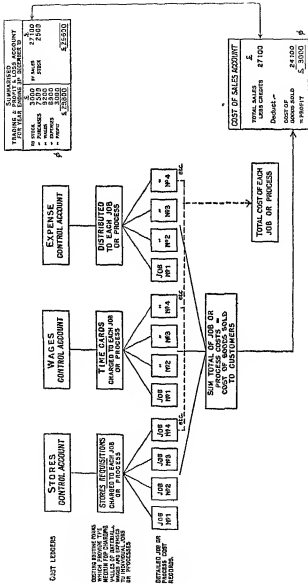


FIG 2 — Showing how the elements of cost are dealt with in a system of costing

position to establish a balance between purchases of materials and the issues from stores, and also to ascertain the amount of stocks on hand, thus we can immediately check any waste or pilferage of material

(10) By summarizing all a man's Time Cards, we can balance these against his wages, and by summarizing the wages by departments we can balance these against the pay roll. Hence, any incorrect charges or costs can at once be detected, departmental estimates checked, and costs proved

(11) By summarizing all the expenses charged to cost, we can compare the amount of (Establishment) Expense recovered in our costs with that actually incurred. Any difference is carried forward to a Suspense Account (which should, of course, show a zero balance at the end of the year if the work under (6) has been correct). At any time we can compare our estimate with the actual in detail, and can see how we are recovering our establishment expense, a most important point

### **Reconciliation of Cost Accounts and Financial Accounts.**

We are now in a position to account in detail for every penny expended inside the factory for labour (wages), materials (purchases), and expenses (other disbursements), and to balance our stocks and total cost of production with the totals of wages, purchases, and impersonal Ledger Accounts in the financial books

A good system of costing does not work on the basis of supposition or guesswork, but is concerned with the recording of actual facts relating to production, distribution, and management. The efficiency of any method of costing will therefore depend to a very great extent upon reliable sources of information

We have seen that the three factors which enter into the cost of a product are grouped under the main headings of

materials, wages, and expenses, and the Chart (Fig 2) is given to illustrate how these elements of cost are dealt with in a system of costing

Having reviewed the objects and advantages of costing, and also seen how a system of costing works, we are now in the position to examine each of the elements in order to see in greater detail how they are dealt with, and the amount and value ascertained and charged to each article, order, or process

## CHAPTER III

### ACCOUNTING FOR MATERIALS

THE merchant or manufacturer who does not keep a detailed record of stocks must rely upon his financial accounts to provide him with any data in regard to the value of goods or materials on hand or sold during a period. In such a case the amount of stocks would be obtained by making an actual count of all items on hand and pricing the list at current market price or cost price, whichever is the lower. This process has to be carried out at the end of each trading period in order that the usual Trading and Profit and Loss Account, etc., can be prepared.

The correctness of the value so arrived at depends entirely upon the accuracy with which all the items in stock have been counted or weighed, upon no item having been inadvertently omitted, and upon no errors having been made in pricing. Errors in the extending and the adding of the list must be guarded against.

If it is then desired to know the value of goods or materials actually sold, the figure is obtained by adding to the value of stocks at the commencement the total purchases made during the period, and from the total of these two items is deducted the value of stocks which are still on hand. The difference is assumed to represent the value of the goods *sold*.

With the above method in use, the merchant or manufacturer does not know by how much his stocks have depreciated in value during the year, nor will it tell him how much waste or pilferage has occurred, because the figure required is only arrived at by inference. A simple

description will serve to illustrate this point. Taking our figures from the Trial Balance on page 4, we have—

Stock at commencement	£3,000
Add purchases	7,500
	<hr/>
	£10,500
Deduct stock on hand at end of period	2,500
	<hr/>
Value of materials <i>sold</i> is assumed to be	<u>£8,000</u>

It must be pointed out, however, that the above method will enable us to ascertain within certain limits the total value of materials or goods *consumed* over a period, but what we specially require to know is the value of goods sold, and it will readily be agreed that this cannot be ascertained simply by inference. Furthermore, we must also know how much material has been wasted or spoilt during manufacture, the amount of shrinkage in stock, and how much has become obsolete.

### Stores Accounting and Control.

✓ A system of cost accounting is concerned with facts, not inferences. If, therefore, a proper record is to be made of all receipts and issues of stocks, an efficient method of stores accounting and control becomes necessary.

✓ Before proceeding with a detailed consideration of stores accounting, it may be well to note that the materials purchased by a manufacturing concern may be utilized in two ways. They may be worked upon for the specific purpose of changing the form or shape, or combining with other materials in order to produce a saleable product.

### Direct Materials.

Materials for the former purpose are known as DIRECT MATERIALS, and the manner in which they are used is such that they can be correctly measured and charged direct to the job, order, or process. For instance, in the case

of a business engaged in the making of suits, the quantity of material and linings used can easily be ascertained, and the correct quantity charged to an order for one suit or a batch of suits

### **Indirect Materials.**

There are, however, certain other materials which cannot be so easily measured and charged direct to the order, but which are necessary if the workmen are to complete their tasks. Such materials are known as **INDIRECT MATERIALS**, and, in the case of the "ready-made" clothing business, will include cottons, braid, stiffenings, pins, chalk, buttons, etc. In addition to these, there will be various other items which are used to maintain the plant in good running order, such as belting, oil, grease, cotton waste, etc., and as these cannot be charged as a general rule to any specific order, they are all classified as indirect materials.

Direct materials may therefore be defined as—

Materials which can be conveniently measured and which can be directly chargeable to the cost of the product,  
and indirect materials as—

Materials which cannot be conveniently measured and cannot be directly chargeable to a product, but only apportioned according to some logical method.

The consideration of materials as an element of cost will fall under the following headings—

- (1) Receiving and storing
- (2) Issues from stores
- (3) Recording in costs

### **(1) Receiving and Storing.**

We have seen from the Chart (Fig. 1) that the cost department is debited with the values of all purchases of materials direct from the financial accounts, and in order that we shall be able to keep track of all the items after



Form No 1

STOCK RECORD CARD											REF No		
BIN No		DESCRIPTION *									Date		
DRAWING No											Min		
											Max		
Order No	Suppliers	Price	Quantity	Date	Reqn No	In	Out	Balance	Date	Reqn No	In	Out	Balance

Size 8" x 5"

they have been received into the stores, there must be provided some means of recording both values and quantities

There are, generally, three separate records in this connection, firstly, a record of the values of materials, in order that we can account for all purchases made (i.e. Stores Account in the Cost Ledgers), and, secondly, there will be two separate records of quantities—one which is kept in the cost department to enable a check to be made on all stores received and issued (Stock Record Card), and another with which the storekeeper is provided, so that he has a record of all the items he handles in his stores (Bin Card)

It will be remembered that in Chapter I three clearly defined branches of cost accountancy were indicated, and bearing in mind that a system must not only find the detailed and total cost of an article or process, but also provide the means of control and reconciliation with the financial accounts, we commence to effect this reconciliation by using the actual figures from the financial books

With a system of book-keeping and accounts, all purchase invoices are entered into a Purchase Day Book or Journal, and at the end of each month this book is "ruled off," and the totals posted to the General or Nominal Ledger, as follows—

Dr Purchases	Cr Sundry Creditors
--------------	---------------------

Credits or allowances for goods which have been returned to the suppliers as defective or not up to standard are entered in a Purchase Returns and Allowances Book, and the totals posted as a debit to Sundry Creditors and a credit to Purchases Account

We therefore make use of these totals, i.e. the total debits less the credits, and open a Stores Control Account in our Cost Ledgers by means of the following Journal entry—

Dr Stores Control Account	Cr Purchases
---------------------------	--------------

The Cost Ledgers have now been opened on the double

entry principle, and if the Purchases Account is regarded as an "Adjustment Account," the Cost Ledgers will be "self-balancing"

The Stores Account will not be concerned with quantities, as its chief purpose is to provide a check on the value of all materials received and issued, and also to show at any time the values of stocks on hand

The process of transferring the actual amount of purchases is repeated each month, so that at the end of the year the total amount charged to the Stores Account in the Cost Ledgers will agree with the total value of purchases made as shown in the Trading Account. Having debited our Cost Accounts with the values of materials that have been received, we shall now proceed to examine the methods generally used for recording quantities, and so complete the analysis and check of all materials received and consumed in manufacture

### **Stock Record Card.**

The most convenient method for recording the quantities of each item is by means of a card system or a loose-leaf book

In those businesses where the number of individual items is small, a loose-leaf Stores Ledger will sometimes meet all requirements, but where there is a large number of items and the records are in constant use, cards are more suitable

A specimen of a Stock Record Card which is kept in the cost department is given (Form No 1), from which it will be noted that a full description of the material is inserted at the head of the form, together with the number of the bin or rack in which the material is contained, or stored

It will be remembered that our Stores Account is debited with the values of materials purchased at the end of each month, but as we shall be receiving goods almost daily, and as all or some of the materials may be issued for



**Bin Card.**

On receipt of the materials in the stores, the storekeeper will place them in the bin or rack so that they will be available for use when required, and will then enter on his Bin Card (Form No 2) the quantity in the " In " column and adjust the " Balance " column

The Bin Card is hung on a hook outside each bin or rack, as this card must be available for entry whenever goods are placed in or taken out of the bin

**(2) Issues from Stores.**

The goods having been placed in stock, and a proper record made on both the Stock Record Card and Bin Card, we will now see how a record is made of all issues

**Stores Requisitions.**

With a well-organized stores the storekeeper is never allowed to issue any materials unless an order in writing, signed by a responsible works official, is presented to him. A specimen Stores Requisition is given (Form No 3), from which it will be noted that, in addition to describing the quantity and nature of materials, the works order number for which the goods are required is quoted

A Works Order is a written instruction which is issued by the works manager to his foreman, authorizing the manufacture of one or a quantity of articles. With a system of job costing, our object is to ascertain the cost of each Works Order, i.e. each job. The cost department, therefore, opens an account for each Works Order issued, so that, as and when we have collected all the items of materials, wages, and expenses for the particular order, we can post the amounts to the accounts and so arrive at the total cost of the job

The storekeeper, on receipt of a Stores Requisition, issues the materials and then enters on his Bin Card the date and requisition number, also the quantity given out



in the "Out" column, and adjusts the figure in the "Balance" column. He then initials the Stores Requisition and sends it to the cost department. On receipt of the Stores Requisition in the cost department, the stock record clerk refers to his card bearing the same bin number as that stated at the foot of the requisition (which was inserted on the requisition by the storekeeper at the time of the issue of goods) and then books out the materials in the "Out" column. He next inserts on the Stores Requisition the price of the materials, which figure he takes from the left-hand columns of his Stock Card.

It must be noted that the only object of inserting on the Stock Record Card the price at which the goods were originally purchased is simply for the purpose of pricing our stores requisitions. As and when orders are placed for materials, the office copy is passed on to the cost department, so that a record can be made of the date and price at which the materials have been bought.

### **(3) Recording in Costs.**

There has now been effected a complete record of the movement of all materials in quantities up to the point where they are given out for manufacture, and at the same time we have provided the basis for checking such issues and the balance of stock that should be on hand at any time. (Note that we are now only concerned with direct materials, as the treatment of indirect materials will be considered in a later chapter dealing with indirect expenses.)

We have yet, however, to provide the figures for crediting our Stores Account in the Cost Ledgers with the values of materials issued for manufacture.

### **Pricing Stores Requisitions.**

It will be remembered that after the cost department had recorded the "quantity" issued on the Stock Record

Card, the price of the materials was then inserted on the Stores Requisition. This pricing of the Stores Requisition does not present any difficulty so long as all materials have been bought at the same price, but should each purchase be made at a different price, we must decide how and at what figure the requisition is to be priced.

Whenever it is possible to keep a record of material by lots, they should always be figured at their original purchase price. The system already described enables this to be done, and a simple illustration will explain the method of pricing all stores issues at their original purchase price.

ORDERED AND RECEIVED			STORES REQUISITIONS.		
Date	Quantity	Price	Date	Quantity	Price
June 1	400	2/-	June 2	250	2/-
" 15	600	2/3	" 5	100	2/-
			" 17	150	50 at 2/- 100 at 2/3
			" 19	400	2/3

Bearing in mind that cost accountancy is only concerned with recording conditions as they actually exist, and not with estimating them, it follows that any method of pricing materials which has for its basis the averaging of the purchase price, will prevent us from arriving at the true material cost. It will, therefore, be seen that the actual purchase price is very necessary where the prices of materials fluctuate violently.

### Charging Materials to Jobs.

From the Chart (Fig 2, page 18) it will be observed that all Stores Requisitions for each Works Order must be charged to the Cost Account bearing the job or works order number, which is necessary if the cost of materials



used on each order is to be ascertained. This charging of materials in our individual job costs could be done simply by taking each Stores Requisition as it is received in the cost department and posting the values to the particular works order number.

When a large number of separate orders are dealt with, this method would be far too expensive, on account of the large amount of clerical assistance that would be required, therefore, a considerable amount of time and labour would be saved if the requisitions were dealt with at the end of each week or month by summarizing them under their works order numbers on to a sheet and then posting the total of each summary to the Cost Account in the Job Cost Ledgers.

### **Job Cost Ledger**

A specimen sheet of a Job Cost Ledger is given (Form No 4), which, it will be noted, is specially ruled so that the detailed costs of each order can be tabulated, and the total of each element shown separately. The front of the sheet contains particulars of the labour cost and an analysis of the workmen's time. On the back is noted the description and quantities of the materials used.

Reference has now been made to two Cost Ledgers, and each serves a special purpose. One contains the details of the cost of all work done (the Job Cost Ledger), and the other (the Cost Ledger) contains all the Cost Control Accounts, which are the connecting link with the ordinary financial books of the concern.

### **Crediting Stock Account.**

In order to complete the entries in connection with our Stores Account in the Cost Ledger, we have yet to credit this account with the values of materials issued.

The actual method used will be settled by the size of the concern and the number of the Stores Requisitions

that have to be dealt with. For instance, with the smaller business the requisitions each day or week could easily be collected and summarized on a "Material Summary Sheet," and the total value of materials issued for the period obtained.

This method would not be suitable with larger concerns on account of the number of items which occur. One could here either make use of the summaries already prepared in connection with the materials used on each Works Order by summarizing the totals charged to each job for the period, or, alternatively, the requisitions could be very quickly dealt with by passing them through a mechanical adding and listing machine.

Having ascertained the total value of materials issued by any of the above methods, a Journal entry can now be made out, crediting the Stock Account and charging a Work-in-Progress Account, as follows—

Dr Work in Progress (Materials) Account  
Cr Stock Control Account

It will now be seen that if our Stock Account is "ruled off" after making the above entry, the figure brought down will represent the value of the materials which are on hand. Such a figure (easily ascertained) makes it possible for a manufacturing concern to prepare its monthly accounts with more accuracy than when values of stocks are estimated, which is generally the case when Cost Accounts are not in use.

### **Work-in-Progress Account.**

When journalizing the value of materials issued, the effect was simply to transfer the values from the Stock Account to another account, called a Work-in-Progress Account, both of which are contained in the Cost Ledger. This transfer of value from one account to another coincides with the transfer of materials from the stores to the works for manufacture.





The Work-in-Progress Account (of which Form No 11 on page 72 is a specimen) is an account charged with all the expenditure in materials, wages, and expenses. The object of employing such an account is to assist in controlling this expenditure whilst the work is being performed in the factory, and to enable ascertainment of the *value* of work that is passing through the factory at any time. Therefore, as and when a particular job or Works Order is completed, we credit this account and charge to our FINISHED STORES the works cost of the goods that have been made. The Work-in-Progress Account will, therefore, only contain figures which relate to the work that is actually *in progress*.

### Maintenance of Stock.

As the manufacture of goods proceeds, and the storekeeper continues to issue materials each day, it is obvious that some provision must be made for replenishing his stocks. In the case of standard or general stock lines, i.e. those materials which are always in daily demand by the factory as opposed to any special items that are only required to fill a customer's particular order, there is fixed a MAXIMUM quantity for each item which should be in stock at any time, and also a MINIMUM quantity, i.e. a quantity below which the stock should not be allowed to fall.

The maximum and minimum figures are entered in the space provided on both the Bin Card and the Stock Record Card, so that immediately the storekeeper observes that any of his stocks have fallen to the minimum (or re-order quantity) he sends a note to the cost department, requesting that a further quantity be ordered, and so prevents his stock completely running out. This note, which is generally referred to as a PURCHASE REQUISITION, is checked with the Stock Record Card, and if the two records agree, the Purchase Requisition is then passed on to the purchasing department for their attention.

### Perpetual Inventories.

With the method of stores accounting in use as described above, one will often find that the annual process of taking stock is dispensed with, and in place thereof is adopted a method of continuous check of stocks. With this method, which is also known as "PERPETUAL INVENTORIES," the storekeeper is allotted a fixed number of bins which have to be counted and checked each day, so that at least once in each year the contents of every bin in the stores are counted and the actual quantities on hand checked with the Bin Card and Stock Record Card. A further check is also made at the time, when the storekeeper notes that any item of stock has reached the re-order quantity. Should, therefore, any difference be discovered between the quantity in stock and that shown on the Bin Card and Stock Record Card, the necessary adjustments are made at the time the Purchase Requisition is passed by the Stock Record clerk.

Whenever a Bin Card has to be corrected, the same alteration has to be made on the Stock Record Card as well, and in order to ensure that this is done, the storekeeper should not be allowed to alter any of his Bin Cards, but instructed to pass them on to the Stock Record clerk, who can then effect the necessary adjustments of both records.

### Stores Losses and Shrinkage.

The rectification of Bin Cards and Stock Record Cards will entail an entry in our Cost Ledger to adjust the values of our Stock Account, and in those cases where the quantity of stock on hand is found to be less than that stated on the Bin Cards, etc., the entry will be a credit to Stock Account and a debit to a "Store Losses and Shrinkage Account."

The Stores Losses and Shrinkage Account is an account to which is charged any loss due to the breaking up of

bulk materials for issue in small lots, as would have to be done in the case of a keg of nails, gross packets of screws, rivets, etc., and in making allowances for the "turn of the scales" when weighing out quantities of materials such as brass strip or other metals, solder, etc., in the engineering trades, and glue in the cabinet making industry

Manufacturing concerns who have their stores organized upon the above principles are in a position to place a check upon the consumption of all materials and to locate and eliminate waste. In fact, they give as adequate a control over materials, or money in another form, as do the accounts in the financial ledgers and actual cash receipts and payments

## CHAPTER IV

### ACCOUNTING FOR LABOUR

THE treatment of labour as an element of cost will follow slightly different lines from that already described for materials in the previous chapter. In the first place, provision must be made for recording the attendance of each workman at the factory for the purpose of ascertaining the amount of wages that has to be paid to him at the end of each week.

Secondly, there must be provided a suitable method of control of values, as was done with materials, so that all money spent in wages each week can be controlled and reconciled in total with the financial accounts.

Thirdly, a record has to be made of the detailed times each workman has spent on a separate Works Order, so that the labour cost of each job or process may be ascertained.

It will be observed from the above that there are two separate records of time and one of total value for the purpose of control only. The two records of time are quite separate and distinct, the first forming the basis for compiling the pay roll or wages book at the end of each week by using what are known as GATE CARDS, and the other is an analysis which is obtained by the use of JOB CARDS for charging individual costs with the correct amount of labour expended thereon. These two records, however, are so arranged that an effective check is provided on all work done, and in those cases where a manufacturer pays his workman a bonus for good work in addition to his ordinary pay, a Job Card is used to provide the necessary data.



## **Time Recording.**

The method of recording the time a workman spends in a factory has undergone many changes. Years ago it was the custom in many industries for a watchman to note in a Time Book the time and the name of each workman on entering the premises, and to send this record to the wages clerk once each day for entering into the wages book.

## **Time Book.**

This method, however, was not satisfactory because it relied too much upon the human element. So long as the watchman could remember the names of all employees, he had very little difficulty in compiling his records, and, provided no one challenged the correctness of his records, everything appeared to be running smoothly, but if a workman happened to be a minute or so late, it was then the rule to deduct half an hour's pay from his wages. As and when deductions were made for bad time-keeping the workmen would invariably dispute the accuracy of the watchman's records. Consequently, this method soon fell into disrepute.

## **Metal Checks.**

A method which was thought to be an improvement upon the above was to provide each workman with a numbered brass check. These checks were arranged in numerical sequence upon time boards placed outside the gatekeeper's office. As each workman entered the factory, he lifted his numbered check from the board and dropped it into a box near by, and then proceeded to his bench or machine. At a stated time, usually two minutes after starting tunes, the box containing the checks was removed by the gatekeeper and the numbers on each check entered into a time book. The numbers on the checks remaining on the time board, representing the absentees, were then

entered on a separate sheet and both records sent to the wages clerk for compiling his wages book

This method, however, was found to be as unreliable as the former. Disputes arose in many instances which could rarely be settled to the workman's satisfaction, owing to the absence of a reliable written record of the times he entered and left the works. It was not uncommon also for a workman to "lift" his absent friend's check from the board and drop it into the box with his own, thus registering the attendance of absentees.

Various other methods were introduced from time to time, but all of them were marked by the same difficulty, namely, the absence of a reliable and indisputable record made by the workman himself.

### Mechanical Time Recorders.

Eventually, mechanical time recorders were introduced, and it is now recognized that a mechanically printed record of arrival and departure is necessary if an indisputable and accurate record is to be obtained.

### Gate Cards

With this method each employee is provided with a form, known as a Gate Card, upon which he records the time he enters and leaves the factory. The workman can see each registration when made, thus establishing confidence and preventing dispute. A specimen Gate Card is given (Form No 5), from which it will be noted that there is inserted at the top of the card the workman's name and his clock number, together with the date of the "pay week". The "times" are registered upon the body of the form, and at the foot is a summary of the workman's pay for the week.

We will now see how these Gate Cards are dealt with in the factory, and for the purpose of illustration it will be assumed that the works employ 50 workmen, and that

No <b>26</b>		Name <b>B. Hirst</b> Week ending <b>10th June 192</b>			
		1	2	Ordinary Time	Over time
	7 <sup>55</sup> SA 12 <sup>00</sup> SA		7 <sup>55</sup> M 12 <sup>30</sup> Z 1 <sup>30</sup> Z 5 <sup>30</sup> Z	4 <sup>05</sup>	
	7 <sup>55</sup> Tu 12 <sup>30</sup> Tu 1 <sup>30</sup> Tu 5 <sup>30</sup> Tu			8 <sup>35</sup>	
			7 <sup>55</sup> W 12 <sup>30</sup> W 1 <sup>30</sup> W 5 <sup>30</sup> W	8 <sup>35</sup>	
	7 <sup>55</sup> TH 12 <sup>30</sup> TH 1 <sup>30</sup> TH 5 <sup>30</sup> TH			8 <sup>35</sup>	
			7 <sup>55</sup> F 12 <sup>30</sup> F 1 <sup>30</sup> F 5 <sup>30</sup> F	8 <sup>35</sup>	
Total Hours				<b>47</b>	
	Hours	Mins	Rate	Amount	
Ordinary Time	<b>47</b>	<b>=</b>	<b>2/-</b>	<b>4</b>	<b>14</b> <sup>a</sup>
Overtime					
Bonus					
Gross Wages				<b>4</b>	<b>14</b> <sup>a</sup>
Deductions	H <b>5</b> U <b>40</b> Sub <b>3</b>				<b>1</b> <sup>a</sup>
A M Upright Letter P M Horizontal Letter	Total £			<b>4</b>	<b>13</b> <sup>a</sup>

each one is paid on the day rate system, i.e. he receives so much per hour for every hour worked, irrespective of the quantity of work he does. The pay week commences, say, on the Thursday and ends each Wednesday, and all wages are paid on the following Friday. The wages clerk prepares the Gate Cards by writing the name and clock number of each workman at the top. The cards are then placed in numerical order in one of the racks after the workmen have gone home on the Wednesday evening, so that they will be ready for use first thing Thursday morning.

As each workman arrives in the morning he takes the card bearing his clock number from the rack on the one side of the clock. This rack is usually known as the "OUT" rack. He then places it in a slot in the clock and registers the actual time. The card is then placed in the second rack on the other side of the clock, called the "IN" rack. When leaving the works at mid-day, the workman takes his card from the "IN" rack, registers his time, and then places it in the "OUT" rack. This process is repeated every time the workman enters or leaves the premises in the morning, mid-day, and evening.

### **Calculating and Making-up Workmen's Pay.**

At the end of the pay week, i.e. Wednesday evening, the wages clerk collects all the cards from the racks, replacing them with fresh ones which have previously been made out for use during the ensuing week.

The number of hours the workman was in attendance on each day is now ascertained and entered by the wages clerk in the fourth column, headed "Ordinary Time," and the total time to be paid for is inserted at the foot. The summary at the foot of the card is now completed, and deductions for National Health and Unemployment Insurances, and any subscriptions to sports club, etc., made, and the net amount to be paid ascertained.

### Pay Roll.

It will now be seen that we have ascertained the total "time" and calculated the net "amount" payable to each workman. There now remains the writing up of the "pay roll" (or Wages Book) in order to ascertain the total wages payable for the pay week under review. The gate cards are therefore sorted into numerical order, i.e. by clock number, and entered in the pay roll, which is ruled in a similar manner to Form No. 6. A cheque is now made out for the total amount as shown in the pay roll, and to ensure that a sufficient number of coins of the exact denomination shall be obtained from the bank, the wages clerk prepares a summary showing how the total amount is to be made up. This is done by running down the column headed "Net Amount Payable" and counting the number of pound notes, 10s notes, half-crowns, two-shilling pieces, shillings, sixpences, and coppers required. The amount to be paid each workman is placed in an envelope or tin box, and the money issued to each man on going home on the Friday evening.

It remains, however, to explain how the amount spent in wages is controlled and also reconciled with the financial accounts, as was done with materials, and to describe the methods used for analysing each man's time to jobs or processes in order that we can determine the actual labour cost of each article, process, or operation.

### Wages Control Account.

The control of wages will proceed on similar lines to that described for materials. Continuing with the illustration above, the cheque drawn for wages will have been entered in the Cash Book and the item posted as a credit to cash (or bank), and a debit to Wages Account in the General Ledger. We now prepare a Journal entry in the cost department, journalizing the total paid each week as follows—

*Dr* Wages Control Account  
*Cr* Wages (General Ledger) Account



The process of journalizing the total amount of wages paid is repeated each week, and at the end of the year the total amount so charged to the cost department must be the total which appears in both the General Ledger and the Trading Account

The cost department has now been debited with the amount of the wages cheque, and the credits to the Wages Control Account will be obtained by summarizing all the times shown on the Job Cards, according to the manner in which the labour has been used, i.e., whether for direct production and a charge to Work in Progress Account, or for performing a service and, therefore, a charge to indirect expenses

### **Methods of Remunerating Labour.**

#### **DAY RATE**

Before proceeding with a description of the methods used for booking time to jobs, etc., it may be well to review briefly the various methods of remunerating labour for work done, since the systems of booking time to jobs are affected by methods of remuneration. For instance, in some industries the workmen are paid according to the amount or quantity of work done. It will be remembered that when describing the routine in regard to the pay roll, etc., it was assumed that all employees were paid at the rate of so much per hour, irrespective of the quantity of work performed. This was one of the first methods used in factories, and is known as the DAY RATE system. For every hour or part of an hour worked, the employee is paid a fixed sum. This method, however, is generally used as the basis for calculating the amount payable to indirect workers, as the nature of their work is such that "time" is the only basis upon which their efforts can be valued.

#### **PIECE WORK**

In the case of direct workers, i.e., men engaged on direct production, the day rate system is not a satisfactory method,

as the rate of pay is not co-related to the quantity of work done, and consequently there is no incentive provided for increased effort. In order to overcome some of the drawbacks attached to the above method there was introduced the PIECE WORK system, which is a method of paying the workman so much per piece of work finished, irrespective of the time taken, in other words, no rate per hour, but instead, a rate per piece of work.

This method is very simple to operate, and assuming that a workman is given 44 pieces of work to do, he would be paid at the rate of, say, 2s per piece completed. Therefore, if he completed all his work in one week, his wages for that week would amount to £4 8s 0d. A week is usually one of 44 hours, and assuming his day rate is 2s per hour, he has only earned his ordinary day rate. Should, however, a workman take 33 hours, his piece work earnings would still be £4 8s 0d, because the quantity of work done and not the time taken is the basis. In this latter instance the workman has made "time and a third," i.e. 33 hours at £4 8s 0d equals 2s 8d per hour (equalling 2s plus one third).

### PREMIUM OR BONUS

Later the DIFFERENTIAL PIECE WORK and PREMIUM OR BONUS systems were introduced. With these methods the quantity of work done is co-related to the time taken to complete the task, each workman receiving a premium or bonus on the time saved, in addition to his day rate for the actual time worked.

There are a number of methods in use, the chief difference being in the amount or percentage given of the time saved, for instance, the Halsey system gives the workmen 50 per cent of such time. With the Rowan system the workman receives a percentage increase equal to the percentage of time saved.

Assuming that a workman is given 44 hours to complete a job, and that his day rate is 2s per hour, and he completes



the work in 22 hours, his pay under the Halsey method would be—

Time taken	33 hours at 2/-	£	s	d
Time allowed	44 hours	3	6	-
Less time taken	33 hours			
	<hr/>			
= time saved	11 hours			
* 50% of 11 hours saved	= 5½ hours at 2/-		11	-
		£3	17	-
		<hr/>		

= to 2/4 per hour for job

Under the Rowan system this same worker would receive—

Time taken	33 hours at 2/-	£	s	d
		3	6	-
Bonus =	$\frac{\text{Time saved 11 hours} \times 100}{\text{Time allowed 44 hours}} = 25\%$			
25% on time taken, £3 6s =			16	6
		£4	2	6
		<hr/>		

= 2/6 per hour for job

Various other methods of premium bonus are in use, but all of them differ in the amount of bonus that is given the workman on the time he saves

### Booking Time to Jobs, Etc.

It will be remembered that in order to credit our Stock Control Account with the materials issued, we summarized all our stores requisitions, and in a similar manner we must now analyse the wages by using our Job Cards in order that we can correctly account for all moneys expended in wages

### DIRECT AND INDIRECT LABOUR

When discussing the question of materials in the previous chapter, it was pointed out that materials used by a manufacturing concern may be utilized in two ways, and that in our Cost Accounts they were classified as direct materials

and indirect materials Similarly, the labour hired will also be utilized in two ways It may be employed in performing work directly on a works order, in which case it can be measured and directly allocated to the works order Such labour is classified as DIRECT LABOUR On the other hand, labour may be employed in such work as repairing machinery, driving a crane, sweeping the shop floor, or in supervising the direct workers In such cases it is not possible to charge the labour to any specific works order on the basis of the actual work done, although without such labour it is probable that the direct labour could not have been applied with equal proficiency

Such labour is classified as INDIRECT LABOUR, and because it is necessary to the efficient conduct of the business, this labour is included in the Establishment Expenses

DIRECT LABOUR may therefore be defined as—"Labour applied to a works order which can be measured and directly charged to that order or product "

INDIRECT LABOUR may be defined as—"Labour which cannot be directly measured or charged to a specific works order, but which can only be proportioned according to some logical method "

Our system, therefore, must be capable of recording two kinds of labour , firstly, there will be the method of booking all direct labour to each works order, and secondly, provision must be made for analysing the amount of indirect labour according to its use

### JOB CARDS

In both instances a Job Card is used similar to the specimen given, Form No 7, and in order to facilitate the handling of these cards in the cost department, all indirect labour is usually provided with a card of a distinctive colour

With most methods of booking time to jobs two racks



Form No 7 (Back)

Worker's Name -		Clock No	
	ON	OFF	HOURS ON JOB
		TOTAL HOURS	
At . = £			

Standard size of card  $7\frac{1}{2}$  ins  $\times$   $3\frac{1}{2}$  ins

are usually provided, similar to those already described for holding the Gate Cards. One is headed "Jobs in Hand" and the other "Jobs in Progress."

When a work order is issued to the works foreman, the necessary Job Cards are made out at the same time, and a full description and quantity of the work to be done by each workman is inserted on the card, together with the Works Order No. and the piece work price, etc.

These Job Cards are placed in the rack "Jobs in Hand," so that they will be available when the men are ready to start on the work. The workman, upon commencing,

takes the Job Card from this rack, registers the time, and then places it in the "Jobs in Progress" rack

By using the two racks referred to the foreman can see what work is in progress, also the number of jobs ahead, and is thus able to keep in touch with the progress of the work in each department. When the job is finished, the workman takes his Job Card out of the Jobs in Progress rack, registers the finishing time, and either hands the card to the foreman or drops it into a box labelled "Jobs Finished." These cards are then collected by the foreman's clerk, and the quantity of work finished is checked and then noted in the space provided. At convenient periods during each day all the completed Job Cards are passed to the wages clerk, who completes the calculations, and so ascertains the amount of piece work or bonus earnings on each job.

With the above method the rulings of the Job Card will require to show all particulars of the work to be done, together with the quantities given out and finished, but in those cases where the cards are not ruled similar to the specimen Job Card, Form No 7, a "Work Ticket" must be used.

A specimen work ticket is given, Form No 8, from which it will be noted that full details of the work are inserted and space provided for noting the quantities inspected and passed.

On completion of the job the Job Card, together with the Work Ticket is dropped into the "Jobs Finished" box.

### Checking Job Cards with Gate Cards

It will be seen from the above that if each workman has been provided with continuity of work, the total times as shown on the Job Cards will agree with the total time on the Gate Card, and in order to prove the correctness of these records, the Job Cards for each workman must all be summarized, and the total compared with the Gate Card.

Form No 8

WORK TICKET				No. 22397
Operation to be done		Date Required	To Department	W Order No
No	Description	Operator		M/c No
OUT		PART & DRAWING No		
	In	Passed	Checked	Recorded by Planning Department
Sig				
Date				
Return with work to Inspection Department as soon as possible				

Size of Form, 5½" wide × 3½" deep

Furthermore, the bonus earnings of each workman must also be added together in order to ascertain how much has to be paid over and above his ordinary day rate. This summarizing and checking is effected by the wages clerk when extending the figures on the Gate Card at the end of the pay week, and to facilitate this work the back of the Gate Card (Form No 5) is generally ruled as shown in the illustration, Form No 9.

In describing the routine in connection with the Job Card it has been assumed that all the workmen were paid according to the piece work system, but had there been in use a premium or bonus system, the routine would be just the same, as only the ruling of the Job Cards (Form No 7) requires alteration. On the front of the card space must be provided for the "Time Allowed" on the work, and in place of the columns for piece work prices, etc., there appear suitable rulings to accommodate the calculations of the bonus earnings as given on page 48.

### **Charging Labour in Costs.**

Having analysed all our direct labour by the use of Job Cards, we are now in the position to charge the correct amount of labour that has been consumed on the respective works orders just as we debited the works orders with the values of materials used by means of the stores requisitions. The Job Cards are therefore sorted into order of Job Numbers, and dealt with by either of the methods described for stores requisitions.

### **Crediting Wages Control Account.**

The credits to the Wages Control Account for direct labour consumed in production can now be effected in a similar manner to that already described when dealing with the values of materials issued, and a journal entry prepared crediting Wages Control Account and debiting Work in Progress (Labour) Account.





It will be remembered that after crediting the Stock Control Account with the value of materials issued, the balance remaining represents the value of stocks on hand. In the case of wages, however, there can be no stock of labour on hand, and we must account for *all* the money spent in wages each week.

It remains, therefore, to deal with the indirect labour for the week under review, and as this item forms part of the establishment expenses of a business, and is analysed according to its use by means of standing orders, it can be more conveniently dealt with under that heading, and any adjustments that are necessary to the Wages Control Account relative to idle time or unallocated time, etc., will be fully explained in a subsequent chapter.

## CHAPTER V

### ACCOUNTING FOR INDIRECT EXPENSES

THE treatment of the Indirect Expenses of a business is one of the most difficult problems of the cost department, and to deal with the subject in all its details would be out of place in an introduction to the subject

When labour is employed to make an article or perform a particular operation, various kinds of tools and equipment must be provided to enable the workmen to complete their tasks. During the period such tools or facilities are being used various expenses will be incurred, and owing to the nature of these expenses, it is not possible for them to be dealt with in our costs in the same way as direct labour and direct materials.

With both direct labour and direct materials it is possible to measure easily the quantity consumed in production, and to deal with each item at the time it is used or paid for. With Indirect Expenses, however, most of the facilities will be used before the amount of the expense so incurred will be known, and appear in the accounts as a liability.

Where, for instance, a manufacturer does not own his premises, he will have rent to pay, and as it is the general custom to pay rent quarterly or half-yearly, there will be several months in the year when no record will appear in the accounts for this accruing liability.

Furthermore, with most systems of book-keeping and accounts, the charge for depreciation of plant and buildings is never made until the annual accounts are being prepared, and in this instance no figures representing depreciation will appear in the accounts until the end of the year. Many other items of a similar nature will require to be included among the indirect expenses, such as rates and taxes, which are assessed quarterly or half-yearly, and the charges

incurred for water, gas, electricity, etc., the amount of which will not be known until the accounts are rendered by the respective supply companies. Plant, machinery and buildings must be repaired and kept in good order, and the total cost of this work will not be known till *after* the work is completed. It will, therefore, be seen that if each works order is to be charged with its correct proportion of all these expenses immediately the work is completed, it becomes necessary to estimate the probable amount of all the indirect expenses that will be incurred during the financial year.

In Chapters III and IV it was shown that the quantity and amount of materials and labour used in an article or on a works order could be measured and valued *at the time they were consumed*, and it will now be seen that with establishment expenses the individual items will not lend themselves to such easy methods, for instance, charges incurred for rent, rates and taxes are calculated on the basis of time, and whilst it may be possible to ascertain the length of time any particular works order has taken to complete and by the use of arithmetic ascertain the proportion of rent, etc., that should be charged to the order, the amount of clerical work entailed in such a calculation renders the method impracticable.

Again, let us consider the question of wages paid to indirect labour, such as labourers, shop cleaners, and the like. A labourer may be employed in carrying materials from the stores to the workmen's bench or machine for use on works orders. The time taken to perform this work will vary according to the quantity of material the labourer has to carry and the distance he has to walk, to book his time to the particular job, therefore, would not only require a most elaborate system, but the cost to the business would be such as would render this method impracticable.

With the wages of shop cleaners, however, it is quite impossible to determine the amount of the individual

employee's wages that is chargeable to a works order. In order to overcome these difficulties all such items are grouped together and dealt with in one total by the methods described below.

### DIVISION OF ESTABLISHMENT EXPENSES

The total indirect expenses incurred by an establishment are known as **ESTABLISHMENT EXPENSES**, and to facilitate the treatment of these items in our costs, they are divided into—

- (1) Works expenses
- (2) Sales expenses

### WORKS EXPENSES

Works expenses comprise all the indirect expenses which are incurred in running the works, such as the cost of repairing and keeping in good order all the plant, machinery, and works premises, the cost of all the indirect labour employed in the works, and the amount of indirect materials consumed in production. These items will include the wages of foremen, charge hands, shop clerks, watchmen, caretakers, shop cleaners and sweepers, enginemen and boilermen, labourers, etc., and in the case of indirect materials, oil, waste, and other miscellaneous supplies. In addition to the above items, there will also be sundry works expenses, such as works travelling expenses, petty cash items, works stationery, etc., and a proportion of the expenses incurred in the general management of the business.

### SALES EXPENSES

Sales expense refers to all the expenditure incurred in the sale and distribution of the firm's products, and this item will therefore comprise the salaries of the sales department and branch offices, commissions to agents, cost of advertising and catalogues, stationery, travelling expenses

of the sales staff, etc., and also a proportion of the expenditure incurred in the general management of the business.

Sales expenses are sometimes referred to as office or general expenses, but as a portion of the purely office, i.e. administrative expenses, as distinct from the sales expenses, are also chargeable to the works, such as stationery, salaries of accountants and secretary's department, insurance, bank charges, etc., the term used above is the more correct.

Before the final objective can be achieved, namely, the ascertainment of the proportion of both works and sales expenses that is to be charged to each works order, several operations must be performed.

The total establishment expenses for the year is firstly estimated, and this work is known as the **COLLECTION** of establishment expenses.

All the items of expense so collected are then analysed according to their use by segregating them under the two main divisions mentioned above, i.e. works expenses and sales expenses, this work is known as the **ALLOCATION** of establishment expenses.

Thirdly, having allocated the expenses, there must be decided the basis upon which each works order shall be charged with its correct amount, this work is performed in two sections, and is known as the **COMPUTATION** and **RECOVERY** of establishment expenses.

### **Collection of Expenses.**

The more simple method of collecting the total establishment expenses is to estimate the normal total for the year by using the figures of previous Trading Accounts as the basis. For the purpose of illustration it will be assumed that the expense items (shown in the first column, Form 10) represent the estimated figures for a period.

An expense allocation statement is prepared, and the items transferred and entered in the "total" column, as shown on Form No 10.

The expenses have thus been "collected," and the next step is to analyse each item under the headings of works expenses and sales expenses

Form No 10

## EXPENSE ALLOCATION STATEMENT

FOR PERIOD ENDING

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Item	Description	Total	Works	Sales
No		£	£	£
1	Light and heat	520	490	30
2	Power	1,495	1,495	—
3	Carriage inwards	205	205	—
4	Carriage outwards	370	—	370
5	Stationery	490	105	385
6	Telephones and telegrams	85	20	65
7	Office expenses	250	—	250
8	Works expenses	180	180	—
9	Travelling expenses	310	25	285
10	Commissions on sales	1,505	—	1,505
11	Branch office expenses	975	—	975
12	Advertising	2,050	—	2,050
13	Salaries—			
	Sales manager	100	—	100
	Works manager	125	125	—
	General manager	150	75	75
	Secretary	60	20	40
	Cost accountant	70	35	35
	Sales departments	350	—	350
	Works offices	110	110	—
	Branch offices	240	—	240
14	Depreciation—			
	Plant and tools	795	795	—
15	Buildings	500	450	50
16	Rates and taxes	140	125	15
17	Fire insurance	95	90	5
18	Sundry works expenses	200	200	—
19	Water rate	60	60	—
		<u>£11,430</u>	<u>£4,605</u>	<u>£6,825</u>

### Allocation of Expenses

Many of the items which appear in the expense allocation statement will not present any difficulty, for instance, depreciation, also repairs and maintenance of plant and

machinery, will relate to the works only, as do also carriage inwards, salaries of works manager and works staff, sundry works expenses, etc. Such items as depreciation of buildings will require to be charged to both the works and sales on the basis of floor space occupied, and such items as stationery, travelling expenses, gas, water, and electricity allocated according to the actual amount consumed by each department.

Those expenses that are incurred in the general management of the business, and which cannot be directly allocated to either the works or sales must be apportioned according to the extent to which each department benefits by the general management.

### **Computation and Recovery of Expenses.**

We have now arrived at the total works expenses and sales expenses which have to be recovered in our costs. There are several methods of recovering expenses, and it remains to decide upon the particular method to use.

These methods may be conveniently grouped under five headings—

- (1) As a percentage on direct wages
- (2) As a rate per direct labour hour
- (3) As a percentage on direct wages and direct materials (i.e. prime cost)
- (4) As a departmental rate
- (5) Machine rate

### **Percentage on Direct Wages**

With this method the works expenses are recovered as a percentage on the direct labour cost of each job or works order, and on account of its extreme simplicity this method is, unfortunately, most commonly used.

Assuming the total direct labour for a year amounts to £5,000, and the works expenses to £3,750, the

percentage rate is arrived at by the use of the following formula—

$$\frac{\text{Works expenses (£3,750)} \times 100}{\text{Direct labour (£5,000)}} = 75\%$$

The amount of works expenses to be charged to each job or works order would therefore be ascertained by adding a figure which would be equal to 75 per cent of the direct labour as follows—

Direct materials	£
Direct labour	35
	<hr/> 40
Prime cost	£75
Works expenses, 75% on direct wages	<hr/> 30
Total works cost	<hr/> <hr/> £105

This method is extremely simple to operate, but the disadvantages more than outweigh any advantages incidental to it. If all the workmen are paid a uniform rate, and if they all work under the same physical conditions, this method will give fairly accurate results, as it will be seen that a worker's earnings are the basis of calculation and not the time taken to complete the work. One of the main objections to this method is that no allowance is made for a job which requires the use of expensive machine tools or for a job which may be all handwork. This is a serious error, because the article or process which requires the use of machinery should have charged to it a greater proportion of the indirect expenses than one which requires the use of little or no machinery.

### Direct Labour Hour Method

This method differs from the above in that works expenses are recovered at the rate per direct labour hour on each job, instead of fixing the rate upon the total amount paid in wages. The total number of direct labour hours is ascertained and divided into the total works expenses,



the resultant figure being what is known as the Direct Labour Hour Rate

Assuming that the total of direct labour hours (i.e. excluding the number of hours worked by indirect labour) is 37,500 and the amount of works expenses is £3,750, the rate is ascertained by means of the following formula—

$$\frac{\text{Works expenses (£3,750)}}{\text{Direct labour hours (37,500)}} = 2/- \text{ per direct labour hour}$$

The amount of works expenses chargeable to each works order under this method will be added as follows—

Direct materials	£
Direct labour	20
	<hr/>
Prime cost	15
Works expenses, 2/- per direct labour hour, say 250 hours at 2/-	<hr/>
	£35
	<hr/>
Total works cost	25
	<hr/>
	£60
	<hr/>

This method gives more accurate results than the percentage on direct wages, because it has regard to the element of time as between a fast worker and a slow worker. If two men, paid by the piece work method, are engaged upon similar work, and one completes his job in 20 hours, the other in 30 hours, the quick worker will use less light, power, supervision, etc. The amount of expense charged to the job under this method will, therefore, be more in proportion to the extent to which the machine tools, supervision, etc., have been used.

It will be seen that with the percentage on direct labour method the percentage addition would be the same in both cases.

### Percentage on Direct Labour and Direct Materials.

This method is very similar to the percentage on direct labour method, except that works expenses are recovered as a percentage on both direct labour and direct materials.

(i.e. on total prime cost) This is perhaps one of the most inaccurate methods, because works expenses rarely, if ever, have any direct relation to the value of materials used. In order to illustrate this point, the manufacture of chemicals offers a very good example. In a certain chemical mixing process the quantity of raw materials used was absolutely fixed, and any variation of the purchase price on the materials was easily computed. The workmen were paid on a piece work basis, and the direct labour cost was only 1s per cwt. The works expenses were extremely heavy, i.e. 7s 6d per cwt. Two men in charge of a mixer regularly produced 5 cwts per hour. The works cost of the process may therefore be stated as follows—

	Per cwt		
	£	s	d
Raw materials	15	—	—
Direct labour	1	—	—
Works expenses	7	6	—
	<hr/>		
Works cost	£23	3	6

A time study was made, and it was found that the running time per mixer could be reduced from 60 minutes to 45 minutes. Under these new working conditions the raw material and direct labour were as before, but owing to the fact that less time has been taken the works expenses were reduced by about 1s 10d per cwt. It will therefore be seen that if works expenses were recovered by the percentage on direct labour and material method, no alteration in the cost would be shown in spite of the fact that the output was increased by reducing the time taken for the operation. With the direct labour hour method, however, a correct works cost would be shown.

### Departmental Rates

The Departmental rate is a method by which works expenses are analysed according to departments, and a separate rate ascertained and used for each department. The rate may be calculated as a percentage on direct labour

or rate per direct labour hour, and the only difference with this method would be that instead of there being one rate to cover all the works expenses, there is a separate rate for each department. In all other respects the rate is arrived at in accordance with the details given above.

This method has many advantages over those already described, as by varying the rates for each department it is possible to arrive at a more accurate cost. A department using expensive machine tools and appliances should be charged with the cost of running and upkeep, etc., and in those departments which do not use tools, such as the assembly department, etc., the departmental rate will not include any part of the expense incurred by the other department using the expensive machinery.

### **Machine Rate.**

The machine rate is regarded as one of the best methods of recovering works expenses, whenever conditions justify its application. With this method the total works expenses are firstly analysed by departments, and the amount of the departments' expenses is then divided by the number of machines or group of machines in that department. This gives the total expense per machine or group of machines, and the figure is then divided by the number of hours it is estimated the machine will run throughout the year, the result being a machine hour rate.

The most difficult problem connected with its use is to ascertain the correct amount of the expense incurred by each machine or group of machines, and this can only be done by making a scientific analysis of all the expense items. Many of the items will require to be analysed upon a different basis, and the following summary will indicate the principles underlying the analysis.

#### *Items allocated direct to machines*

Depreciation of plant and machinery

Repairs and upkeep of plant and machinery

- Power consumed
- Oil, waste, and miscellaneous supplies

*Items allocated on basis of floor space occupied*

- Rent, rates, and taxes
- Depreciation of buildings
- Repair and maintenance of buildings
- Insurance on buildings

### Miscellaneous Expenses.

The items comprising miscellaneous expenses will vary with each industry, and in some cases it is possible that some of them can be charged direct to the machine or department, but where this is not feasible, the items are allocated upon a more or less arbitrary basis. The items referred to will include—

- Foremen's wages, supervision
- Watchman and caretaker's wages
- Shop cleaners and sweepers
- Crane drivers, etc., and
- Miscellaneous shop supplies, etc

The basis of a machine rate is the number of productive hours it is *estimated* each machine or group of machines will run throughout the year, assuming the factory will be working to its full normal capacity, i.e. full ordinary time. It will, therefore, be seen that if the estimate for the year is not achieved, there will be a certain amount of expenses "unabsorbed," and in this connection there is usually employed an account known as the "Unabsorbed Machine Rate," and all the unabsorbed expense is charged to this account at the end of each month. Assuming that the machine hour rates are dealt with on a monthly basis, the estimated figures are divided by twelve to give a monthly quota or standard which should be charged to costs. Any difference above or below this monthly quota is transferred to the Unabsorbed Machine Rate Account.

If the total number of machine hours for the year has been correctly estimated, the Unabsorbed Machine Rate Account will show a zero balance at the end of each year, but as it is rarely, if ever, possible to estimate to such a degree of accuracy, the account will generally show a debit balance. The balance of this account, therefore, will indicate to the manufacturer the extent to which his plant is unproductive, as it will be remembered the estimate of the machine hours was based upon the normal output capacity. Such information enables the management to take the necessary steps in order to secure a greater share of orders, as all variations from the normal will be reflected by the Unabsorbed Machine Rate Account.

The choice of any one of the above methods will depend entirely upon the nature of the business, but in order that we can complete our proposition and ascertain the total cost of a works order, we will assume that the percentage on direct labour method is chosen.

We have already ascertained and charged each works order with the amount of direct labour and the value of materials consumed, and there only remains to add the percentage to the direct labour figure in order to arrive at the total works cost.

### Recovery of Sales Expenses.

With regard to sales expenses, the treatment of this item will also be guided by the nature of the industry which is carried on, for instance, if the business is engaged in making only one article, the sales expenses could be dealt with easily by arriving at a rate per article, and charging our costs on this basis, but as most firms will be engaged in the manufacture of several articles, the sales expenses may then be expressed as a percentage on the works cost. The formula for ascertaining such a rate would be—

$$\frac{\text{Total estimated sales expenses for year} \times 100}{\text{Total estimated works cost of goods sold for year}}$$

The final ascertainment of the cost of a works order can now be effected, and for this purpose there has been provided suitable spacing at the top of the account, which, it will be remembered, was opened in our Job Cost Ledger (*see* Form No 4), and the amounts for direct labour and materials are posted from the summaries already described, the columns totalled, and the summary at the head of the sheet completed

### Expense Control Account.

Before any entries are made crediting the Expense Control Accounts with the proportion of expenses chargeable to all the completed work, it will be well to refer again to the figures which appear in the Expense Allocation Statement (Form No 10)

On referring to the chart (Fig 1), it will be seen that all the expenses are charged to the cost department at the end of each month, or, in other words, as and when each item is paid for or passed over the ordinary books of account. When fixing the expense rates, however, all the items of expense for the year were estimated in advance, so that we now have two sets of figures to deal with, namely, the actual and the estimated

It will be remembered that in Chapter II, page 19, it was stated that by summarizing all the expenses charged to cost, the amount of expenses recovered can be compared with those actually incurred, thus we can see how we are recovering our establishment expenses, a most important point

The Expense Control Accounts must, therefore, be operated in such a manner that this comparison can be easily made, and this is done simply by taking the estimated figures which appear in our Expense Allocation Statement (Form No 10) and dividing the totals for each works and sales expense by twelve to give us an average for each month or by four if working on a quarterly basis

Bearing in mind that the expenses have been estimated or predetermined on the assumption that the works will be running at its full normal hours (which in most trades to-day is 44 hours per week), any difference between this monthly or quarterly average and the actual amount recovered in our costs will represent the extent to which the plant has been unproductive

By estimating on this basis there is provided a standard for the purpose of the comparison mentioned above. Having fixed the standard for each period, we are now in a position to proceed with the entries relating to both works and sales expenses, and so complete the function of cost control of expense similarly to materials and labour.

With regard to the actual expenses, we proceed on similar lines to that described for labour and materials, and at the end of each month or quarter prepare a journal entry debiting the Expense Control Account in the Cost Ledger with the *actual* expenses appearing in the financial accounts as follows—

Dr Expense Control Account	*
Cr General Ledger Expense Accounts	

We now proceed to "allocate" the actual expenses by using an Expense Allocation Statement and journalize the result obtained as follows—

Dr Works Expense Control Account
Sales Expense Control Account
Cr Expense Control Account

The effect of this entry is to close the Expense Control Account by transferring the amounts to the Works and Sales Expense Control Accounts.

The total expenses charged to a works order or job will now be dealt with in a similar manner as in that for labour and materials. If the percentage on direct labour method is used, it will be seen that the total amount of works expenses is ascertained by referring to the Wages Control Account or the Work in Progress Account, as

either of these will give the total direct wages charged to costs for the month in question, alternatively the amounts charged to the individual works orders can be summarized and a journal entry prepared, as follows—

*Dr* Work in Progress (Expense) Account  
*Cr* Works Expense Control Account

We have now accounted for all direct materials, direct labour, and establishment expenses consumed on an order, and charged the respective amounts to a Work in Progress Account, but as the object of a Work in Progress Account is to enable us to ascertain at any time the amount of work that is in progress only, there yet remains to credit this account with the value of work completed and passed into the finished stores. It must be noted that the sales expenses have not yet been dealt with, as this item must not be added to our manufacturing cost but to the sales cost, and this cannot be done until the goods are *sold*.

The figures for our credits to the Work in Progress Account are obtained as follows. Immediately a works order is completed, the goods are passed into the finished stores ready for issue against a customer's order, and we therefore summarize the works cost of all completed orders and journalize the total as follows—

<i>Dr</i> Finished Stores Control Account	£
<i>Cr</i> Work in Progress Account	£
Direct Materials	£
Direct Labour	£
Works Expenses	£

A specimen Work in Progress Account, Form No 11, is given in which has been incorporated all the journal entries which have now been dealt with, and a balance brought down to represent the value of work still in progress at the end of the period.

With many concerns, however, the large number of items that have to be dealt with will necessitate the journal entries being made out at very frequent periods, and in order that all the entries relating to materials, labour,



and expenses can be grouped together, sub-accounts are used for each of these elements

In such cases, therefore, there would be used the following accounts—

Work in Progress Account	Materials Section
"	" Labour Section
"	" Expense Section

and a fourth account similar to the illustration given, to which would be transferred the balances of each of the above sub-accounts at the end of each costing period

Form No 11

### WORK IN PROGRESS ACCOUNT

Dr				Cr			
June 1	To Materials issued		£	June 7	By completed work delivered to finished stores—		£
	" Direct	JE 5	5,750		Materials	3,870	
	" Wages	JE 6	6,405		Wages	4,641	
	" Works expenses	JE 7	3,950		Expenses	3,094	
					By Balance c/d being value of work in progress at this date—		
					Materials	1,880	
					Wages	1,764	
					Expenses	856	
							4,500
			<u>£16,105</u>				<u>£16,105</u>
June 7	To Balance b/d—						
	Materials		1,880				
	Wages		1,764				
	Works Expenses		856				
			<u>£4,500</u>				

When goods are issued from the finished stores for despatch to customers, we journalize the works cost of the article, crediting the Finished Goods Control Account and debiting a Cost of Sales Account. Using a Finished Goods Control Account, we are able to ascertain at any time the value of finished goods on hand, as was done with



From the specimen Cost of Sales Account given in Form No 12, it will be seen that the works cost of all goods *sold* for the month (or week) is entered on the debit side, together with the proportion of sales expenses, and on the credit side the total net sales for the period

The value of goods returned by customers and replaced into the finished stores is shown separately as a contra item to the amount of credits appearing on the debit side

## CHAPTER VI

### ACCOUNTING FOR INDIRECT EXPENSES (*contd*)

WE have now seen how all the direct materials which have been issued from stores for use on a works order, also the amount of direct labour consumed in production have been accounted for in our costs. As a next step, establishment expenses, which were dealt with in the previous chapter in total and on the basis of an estimate for the purpose of predetermining the rate to be used when recovering both works and sales expenses in costs, are now brought together so that a complete and detailed check can be made upon the expenses recovered in our costs as against those *actually* incurred.

The Expense Control Accounts, which were dealt with in the previous chapter, will only "control" such expenses "in total," and whilst this is necessary, it will readily be seen that the Control Accounts alone are of limited managerial use, because they do not show in sufficient detail why or how the money has been spent.

The purpose of this chapter, therefore, is to explain the principles involved in accounting for indirect expenses in detail.

#### Standing Works Orders

A system of Standing Works Orders is brought into use, so that the cost of each class of "indirect" work can be ascertained by charging to a separate order in a similar manner as was done when "direct" work was charged to a Works Order Number to find the cost of each job or article.

The reason for naming this class of orders as "standing" is due to their permanence, i.e. they stand from month to month, and through them the indirect expenses or costs are controlled in detail, both in regard to indirect materials and labour, and also other sundry indirect expenses. It must be borne in mind that a Standing Works Order bears

no relation to a works order. The latter is an instruction to manufacture for sale, the former is an instruction for service to be rendered by the works to the works.

### CAPITAL AND REVENUE EXPENDITURE

The indirect expenses of a manufacturing business are of two kinds; firstly, there will be the expenditure of labour and materials in the making and erection of new plant and machinery, tools, buildings, etc., and which will ultimately be a charge to the capital accounts in the financial books, because the work so performed increases the value of such assets, and, secondly, the expenditure relating to the repairing, maintenance, and upkeep of such capital assets, also the cost of other service departments in the works such as shop cleaning, inspection and viewing, supervision, labouring, lighting, heating, packing, store-keeping, etc.

The number and the names of the items which comprise Standing Works Orders will vary with the nature of the industry and the size of the business to which they relate, but the following specimen list will serve to illustrate how Standing Orders can be used as a means of analysing all indirect expenditure in such a manner as will clearly show why and how the money has been spent, thus assisting the manager in the control of the business.

		CAPITAL EXPENDITURE			
S W O No	51	Erection of new	power plant		
	52	" "	lighting plant		
	53	" "	machine tools		
	54	" "	fittings		
	55	" "	buildings		
		REVENUE EXPENDITURE			
S W O No	101	Repairs and maintenance of	power plant		
	102	" "	lighting plant		
	103	" "	machine tools		
	104	" "	fittings		
	105	" "	buildings		
S W O No	201	Shop cleaners and sweepers			
	202	General labouring			
	203	Inspection and viewing			
	204	Supervision			

S W O No 205	Storekeeping
206	Unallocated time
207	Packing and despatch
208	General purposes (i.e. oil, rags, waste, and all other such sundries)

The Standing Works Orders relating to work on capital items (i.e. capital additions) are usually dealt with slightly differently from those given for revenue expenditure, taking as an example S W O 53, it would be the practice to issue an order for each job that has to be done, so that the cost of the work can be noted upon the record that is kept of each piece of machinery. Assume, therefore, that a new machine tool which has been delivered, such as a radial drill in an engineering shop, or a power driven sewing machine in a ready-made clothing factory, requires fixing in position. The order for its erection would be issued to the plant maintenance department or works engineers, bearing the reference "S W 53/1". The S W Order No 53 indicates the nature of work to be performed and the "stroke number 1" the separate account to which the cost is to be charged.

All materials issued from stores, such as cement, angle iron, holding down bolts, etc., also the time of the men engaged upon the work, would, therefore, be booked to this account number in just the same way as was explained when dealing with the ordinary works or production orders. When the next piece of machinery is delivered, the S W Order Number issued would be S W 53/2, and the work entailed in connection therewith charged to the sub-account No 2. By this means it is possible to ascertain the cost of the work done on each piece of new machinery.

Similarly, the work in connection with the repairing, maintenance, and upkeep of plant, machinery, and buildings is analysed to show the expenditure incurred on behalf of the individual machine tool or building, etc.

The numbers 201 to 205 chiefly relate to indirect labour, as no materials will be booked to these accounts, whereas

Account No 207 will have charged to it materials used in packing, in addition to labour Account No 206 provides very important information regarding the time that is lost by the direct workers in changing over from one job to another or for various other reasons In all manufacturing concerns there will always be stoppages and delays due to many causes, some of which are unavoidable, and in order to assist the management in keeping this "unallocated" time at a minimum, there is usually a number of sub-accounts to the main S W Order For instance, time will be lost in reporting to the foreman between jobs, in waiting for a fresh order to be issued, waiting for materials, in "washing up," or any other cause which will keep the workman away from his "productive" work

In those industries, therefore, where lost time is due to many reasons, the Standing Orders are arranged to show the cause, and in such a case S W Order 206 would have sub-accounts similar to the following—

S W 206/1	Belt broken	
„ 206/2	Waiting for materials	°
„ 206/3	Waiting for tools	
„ 206/4	No work	
„ 206/5	Machine breakdown	

### Accounting for Indirect Materials.

Whenever materials are required in connection with the work to be done on an S W O a stores requisition is used, but to differentiate between the requisitions issued against a works order, a different coloured form is necessary In some cases, however, a special requisition is printed, the chief alteration being at the top of the form (*see* Form No 3), as the symbol "S W" must be quoted in place of "W O" The use of different coloured forms will not only facilitate the work in the cost department, but upon their presentation to the storekeeper, he can see at a glance that the materials required are for use on indirect work, and so can take the necessary steps to check the requisition before issuing the goods

The quantity of materials issued is noted on the Bin Card, and the requisition then sent to the stock record clerk in the cost department, who deals with it in exactly the same manner as explained in Chapter III

### Accounting for Indirect Labour.

The recording of the indirect workers' time is effected in a similar manner as was described in Chapter IV for direct labour, excepting that the Job Cards will be of a distinctive colour, and that the S W Order number is quoted in place of the works order. A Job Card ruled similarly to Form No 5 is generally used, because the nature of the work to be performed is such that the workmen cannot be paid by the piece work or bonus methods, but only upon the day rate method. No particulars, therefore, are necessary in regard to piece work or bonus earnings.

It will now be seen that the card racks will not only contain Job Cards relating to works orders in hand and in progress, but also those of Standing Works Orders.

Having now ascertained the values of materials issued for use on each S W Order, and also having analysed the indirect labour by the use of Job Cards, we can now proceed to summarize each of these elements, and so provide the figures for charging each S W Order, and at the same time complete the journal entries in connection with the Materials and Labour Control Accounts.

The charging of materials and labour to each of the Standing Works Orders in the Cost Ledger will be effected in just the same manner as was done for ordinary works orders, and the requisitions and Job Cards either posted direct to the Account or summarized on "Collecting Sheets."

The total of materials and labour for the week or other period is then journalized as follows—

Dr	Standing Works Orders
	Cr Stores Control Account
	Wages Control Account



After posting the above journal entry to the Cost Ledgers, the Wages Control Account for the week under review will now show a zero balance. Bearing in mind that we have already checked the times shown on the Job Cards with the Gate Cards of each man when calculating the total pay for the week, any differences would have been dealt with at the time and the records adjusted accordingly. We have, therefore, now completely effected the reconciliation of the moneys paid in wages with the financial accounts, and at the same time accounted in detail for both direct and indirect labour. Similarly, the balance now remaining in the Stores Control Account will represent the value of the raw material stocks on hand, as actual quantities in stock have been physically checked by taking a fixed number of bins each day and comparing the totals shown on the Stock Record Card. We have, therefore, also effected reconciliation with the financial accounts for this item, and at the same time accounted in detail for both direct and indirect materials consumed in production or on Standing Works Orders.

Furthermore, by summarizing the totals charged to each Standing Works Order, we can now prepare a statement of the actual indirect expenses, and so account for all moneys spent upon indirect work.

We have, in fact, carried out all the operations previously described as necessary in the sphere of cost finding and cost control, in so far as they relate to Job-Costing Methods.

## CHAPTER VII

### METHODS OF COST FINDING

#### Job Costing Systems.

THE principles of Job Costing can be so usefully applied in such a variety of trades, that it is impossible in an elementary work of this nature to give a detailed description of the actual methods or routine that would be used under many conditions

It has been seen from the previous chapters that the principles of costing are such that they can be applied to *any* manufacturing business. The actual method of applying these principles will be guided entirely by the nature and size of the business, and the routine already described was given by way of illustration only, and must not be accepted, therefore, as the only method that can be used. A system of cost accountancy must be devised to fit the business; and not the business to the system.

The basis of the job costing method is the costing of an individual job or piece of work. The job may be an order for a large quantity of articles or for one only, as mentioned in Chapter II, when it was explained that a works order may be issued in the ready-made clothing business for one or a batch of ~~suits~~ *suits*. In the engineering trades the job may cover the manufacture of 1,000 set screws or a single casting, and in the building trade it may be for one or a number of houses. Whatever the quantity may be, the basic principle remains, i.e. the ascertainment of the cost of the job. In most factories the job is covered by the works order, production order, or standing works order, whereas with builders it is by the "contract."

With the smaller size of firm the costing of a job is a comparatively easy matter if the methods as described in



and labour consumed to the respective accounts. Furthermore, by summarizing the total cost of each sub-order, we not only arrive at a final cost of making the 2,000 electric motors, but can tabulate our summary in such a manner as will clearly show the extent to which the various elements have entered into the final product.

### JOB COST SUMMARIES

It has been shown in the previous chapters how each element of cost is dealt with, both in detail and in total, in a system of job costing, and there remains only to consider the final summarizing of the individual costs so obtained.

The method that will be used for summarizing a cost will depend upon the nature of the business and the amount of information required by the management.

Examples of cost summaries will only be given, therefore, to illustrate in a general manner their form, and the amount and type of detailed figures usually given.

With many systems the summary of the complete cost is shown at the top of the sheet which is contained in the Job Cost Ledger, of which Form No 13 is a specimen. It will be noted that the ledger sheets which contain details of the cost of a job are not ruled with debit and credit columns as in the ledger which contains the various Cost Control Accounts, but that the space is more usefully occupied for analysing the various items.

The specimen given, Form No 14, is ruled for summarizing the detailed costs which have been previously collected on a materials or labour collecting sheet, and is usually inserted in front of the collecting sheets in the ledger.

Many firms continually manufacture stock lines in either small or large quantities, such as in the ready-made clothing business, and require their cost statistics in a form that will allow of easy access, and in such cases a card

Form No 15

## COST SUMMARY

DESCRIPTION

Job No	Date Manufacture Commenced		Date Manufacture Finished		Date		Style	Pattern No	Size	Stock Order No
	f	s	f	s	f	s				
Direct labour										
Direct materials										
Prime cost										
Works expenses										
Total works cost										
Sales expenses										
Total cost										
Per cent profit										
Selling price										

REMARKS

Size of Form 8" X 5"

record system is often used. Form No 15 is an illustration of a cost summary which is contained on an 8"  $\times$  5" card, and is ruled to show both the total and detailed costs of the complete order, and the average cost of each article.

The forms described above are specially suitable for summarizing the cost of works orders that have not been split up into sub-orders, but in the example of the several orders issued for the making of 2,000 electric motors there would be required a special form for summarizing the costs of each sub-order similar to the ruling of Form No 14. The object of this form is to summarize on one sheet the detailed materials, labour, and expense items of each component, and to arrive at a final cost of the whole order. It will be noted that at the foot of the form there is provided space for inserting the analysis of labour and materials, also the total number of hours for each class of labour.

The back of this form is generally ruled to accommodate other useful information, according to the requirements of the business.

## CHAPTER VIII

### METHODS OF COST FINDING (*contd* )

#### **Process Costing**

THE process method of costing is much simpler, and in the majority of cases does not entail the same amount of detailed routine or number of forms as are required with the job costing method. The process method is used in all cases where one article of a batch loses its identity and becomes a part of a larger volume of production. The method is used in the manufacture of chemicals, paint, varnish, and oils, paper, cloth, food-stuffs, production of electricity, most kinds of metals, also the working of coal mines, slate quarries, and the like. Process costing is also used by firms engaged upon the manufacture of one article whenever the parts of the article can each be made in one department.

The object is to ascertain the cost of each variety of operation. A Process Cost Account is employed for each operation or process, and is debited with the value of all materials and labour used, together with the correct proportion of indirect expenses for each process. Any by-product arising from each operation is credited to the Cost Account, and the balance represents the cost of the final quantity produced. The pro forma account, Form No 16, will serve to show the principles of this method.

#### **Steam Raising Process Costs**

With most factories steam is used for various purposes, such as for heating, drying, baking, etc., in addition to being used for motive power. The method of process costing is, therefore, employed to ascertain the cost of steam, as the expenditure must be analysed in order that

## PROCESS COST ACCOUNT

Form No 16

Dr							PROCESS No 1							Cr						
Date	Description	T	C	Q	£	s	d	Date	Description	T	C	Q	£	s	d					
June 3	Materials	10	4	-	100	-	-	June 4	Balance											
	Direct labour				90	-	-		c/f to A/c											
	Direct charges				25	-	-		No 2	10	4	-	235	-	-					
	Indirect ex penses				20	-	-													
		10	4	-	£235	-	-			10	4	-	£235	-	-					

Dr							PROCESS No 2							Cr						
Date	Description	T	C	Q	£	s	d	Date	Description	T	C	Q	£	s	d					
June 4	B/t Process No 1	10	4	-	235	-	-	June 7	By products											
	Materials	10	-		85	10	-		A/c at £40											
	Direct labour				105	-	-		per ton	2	5	-	90	-	-					
	Expenses				80	-	-		Balance, c/f	8	-	-	415	10	-					
									A/c No 3											
									Loss in weight											
									by vaporiza	2	-	-								
									tion											
		10	14	-	£505	10	-													
										10	14	-	£505	10	-					

Dr							PROCESS No 3							Cr						
Date	Description	T	C	Q	£	s	d	Date	Description	T	C	Q	£	s	d					
June 7	B/t Process No 2	8	-	-	415	10	-	June 9	By products A/c at £45 per ton	4	10	-	202	10	-					
	Materials	1	6	-	35	-	-		By Balance, being final cost of pro duct	4	16	-	334	-	-					
	Direct labour				40	-	-			9	6	-	£536	10	-					
	Indirect ex penses				46	-	-													
		9	6	-	£536	10	-													

Dr		BY-PRODUCT ACCOUNT										Cr			
Date	Description	T	C	Q	£	s	d	Date	Description	T	C	Q	£	s	d
June 7	To By pro ducts b/l, No 2 A/c														
		2	5	-	90	-	-								
June 9	Ditto No 3 A/c														
		4	10	-	202	10	-								
		6	15	-	£292	10	-								



the cost for each service can be discovered and a check placed upon any waste

The expenditure in coal, water, oil, waste, miscellaneous stores items, and labour, is directly allocated to a Steam Raising Account, and the final cost per 1,000 lb of steam produced or per 1,000 lb of water evaporated is figured. Form No 17 is a specimen of a Steam Raising Account, from which it will be noted that the difference between the quantity of steam raised and the quantity used represents the wastage or loss for the period

It was mentioned in an earlier chapter that in many instances one may find both the job costing and process costing methods in use in the same factory, and the above example of a Steam Raising Account will illustrate this point, as such an account may be used in a factory using the job costing system

### **Process Costing for Paint and Varnish, Etc.**

In order to consider the detailed routine in connection with the process method of costing, a further example is given of the methods used in connection with the manufacture of paint, and to simplify the proposition it will be assumed that only one class of paint is made

The object being to ascertain the cost of each process, it firstly becomes necessary to consider the nature of the product, in order that a correct classification of processes can be made. In an efficiently organized business the factory departments will usually indicate the separate processes, and in the case under review these will be—

- |              |                           |
|--------------|---------------------------|
| (1) Mixing   | (4) Tinting               |
| (2) Grinding | (5) Filling               |
| (3) Thinning | (6) Labelling and packing |

In addition to the above process departments, there will also be the various service departments, such as—

- (1) Laboratory and inspection
- (2) Maintenance and repair of plant and machinery

## BOILER HOUSE

STEAM RAISING ACCOUNT *for month ending*

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Description	£			s			d			Average per 1000 lb Water Evaporated	Total for Year to Date			Average for Year to Date					
	£	s	d	£	s	d	£	s	d		£	s	d						
Coal																			
Cartage and handling charges																			
Ash removal																			
Water																			
Oil waste and sundry stores																			
Wages																			
Repairs and maintenance																			
Depreciation																			
Rates and taxes																			
Insurance																			
General expenses																			
Etc																			
Etc																			
FINAL SUMMARY																			
	Per 1,000 lb									Quantity									
Coal consumed	Total cost									Less Steam used—									
Water evaporated	Drying									Power									
Steam used	Heating									Etc									
									Losses for month										
Prepared by									Approved										
Date																			

- (3) Lighting, heating, and power
- (4) Works clerical staff
- (5) Sales departments
- (6) General administrative departments

The labour used and the materials consumed by each department, such as pigments, vehicles, cans, kegs, and other containers, also labels, etc., will now become a charge to the Departmental Process Account, and not to each order going through the factory, as was the case with the job costing method described in previous chapters

### **Direct Material.**

In the manufacture of paint it is usual for each department to work to a standard formula, which is issued with the requisite number of copies. The original is used in a similar manner as the works order described in the chapter dealing with job costing methods, and serves as complete instructions to the various departments. One copy of the formula is also sent to the cost department, and forms the basis for charging the various processes with the materials required, and finally ascertaining the cost. A specimen formula is given (Form No 18), from which it will be noted that the various kinds of materials necessary and the quantity to be used are stated. It is not always necessary to make out a stores requisition, as would be the case with the job costing system, as the materials are generally issued against the standard formula.

As the process of manufacture proceeds and the materials are transferred from one department to another, the Process Accounts in the Cost Ledgers are ruled off, and the balance carried forward as a charge to the department receiving the materials for the next working.

The value of the materials drawn from stock, and as stated on the working formula, provides the necessary data for crediting the Stores Control Account and debiting the respective Process Accounts.

## STANDARD FORMULA

DESCRIPTION

No

Date  
IssuedDate  
FinishedQuantity per Mix  
Gallons    Lbs

DESCRIPTION OF RAW MATERIAL TO BE USED

Quantity •

Item No

PROCESS

Item No

TINTING INSTRUCTIONS

Size of Containers

Number to be filled

Issued by—

Checked by—

Approved—

Size of Form 10" x 8"

**Direct Labour.**

If all the workmen in each department are continuously engaged upon one process, the charging of direct labour to each process will not present any difficulty, as an analysed form of pay roll could be arranged to give all the necessary information. A specimen pay roll is given (Form No 19) from which it will be noted that columns are provided for analysing the wages of the respective process and service departments.

In those cases where workmen would be performing two or three operations or working firstly in one department and then in another, it becomes necessary to use a daily time ticket in order to obtain the necessary analysis. A specimen daily time ticket is shown (Form No 20). Each

*Form No 20*

DAILY TIME TICKET		
<i>Clock No</i>	<i>Date</i>	
<i>Name</i>		
REF	DEPARTMENT	HOURS
	Mixing Grinding Thinning Tinting Filling Labelling and packing	
	Laboratory and inspection Maintenance and repairs Lighting, heating, and power Works, general service	
TOTAL		
<i>Cost Department Check</i>	<i>Approved—</i>	
	<i>Foreman</i>	

*Size of Form 5" × 4"*





workman fills up his time ticket at the end of the day and hands this to his foreman, who checks the analysis of time, signs the ticket, and sends it to the wages department. At the end of each pay week the total number of hours, as shown by the daily time tickets, are compared with the total hours shown on the Gate Cards and the analysis of the pay roll completed from the information so obtained. The totals of the pay roll are then journalized as a credit to the Wages Control Account, and a debit to the individual process or Service Accounts (i.e. Standing Works Orders).

### Works Expenses.

The whole of the expenses of the business are collected and allocated in exactly the same manner as described for job costing, only in this instance the allocation will be made on the basis of departments, as it will be remembered that each department coincides with the separate processes. When dealing with the works expenses in connection with a system of job costing, a proportion of the indirect expenses were recovered upon each works order, so that the cost of each job or article could be ascertained.

With the process method of costing, however, the same means cannot be employed to recover the indirect expenses, as the individual article or order loses its identity by becoming a part of a larger volume of production. Works expenses, therefore, are dealt with upon the same principle as both materials and labour, i.e. they are charged *en bloc* to the department's output. The figures to be used in this direction are obtained from the Expense Allocation Statement, which is prepared for a period of either six or twelve months, and the total expenditure divided to give either a daily, weekly, or monthly quota. Assuming a factory to be working on a monthly basis, one-twelfth of the expenses of each department for the year is charged to the Departmental Process Account, and the amount journalized as a credit to the department's Expense Control



Account, and a debit to the Departmental Process Cost Account

As the process of manufacture proceeds and the paint is ultimately delivered to the filling and labelling and packing departments, the cost of the containers used in these departments will form a charge to the "Filling and Packing" Cost Account. The value of the product when leaving the tinting department is not charged to the packing and labelling, etc., as the object now is to ascertain the cost of filling, labelling, and packing only. Upon completion of these operations the final cost of the product is summarized upon a cost summary ruled similar to Forms Nos 13 and 18.

It will be noted that the various process accounts mentioned above are practically sections of a "Work in Progress Account," which was described on page 33, as the purpose which they served is to show the cost of the work in progress during the period it was passing through each process.

## CHAPTER IX

### ORGANIZATION AND ROUTINE FOR COST DEPARTMENT

THE routine and procedure of work in a cost department is not determined by its own needs, but by the needs of the factory it is serving. For instance, with most other clerical departments the work is arranged according to the calendar, and certain days fixed for certain work, whereas the procedure of the costing department cannot be wholly planned in this way, as the work on a production order will not necessarily end on the last day of the week or month, and so enable the final cost of all work to be ascertained on fixed dates.

Furthermore, the pay-week in nearly all instances does not commence on the Monday, but usually either Thursday or Friday. It will, therefore, be seen that whilst a certain amount of routine can be planned in conjunction with the calendar, there will be many important functions which can only be performed as and when the production is completed on each work order.

The general arrangement and layout of a cost department and the procedure in regard to statistical records cannot be dealt with in any great detail in an elementary work of this character. This chapter, therefore, will only deal with the more important sections of the internal and detailed work of a cost department in a general manner.

#### **Inter-departmentalization**

We have seen that the three factors which enter into the cost of an article or work order are grouped under the main heads of materials, labour, and expenses, and as the work entailed in accounting for each of these elements is dealt with by the separate sections of the routine already described, it is necessary that the internal activities of the

cost department be sectionalized accordingly, so that the responsibilities of each clerk can be easily and correctly defined

With a large concern the clerks employed on each section are generally placed in the charge of a sectional head or section leader, who is responsible to the chief cost accountant for the quality of the work and the discipline of his own staff

The division of the cost department in such cases may require that the work in connection with the preparation of periodical statistics and final aggregate cost reports, etc., be also confined to one section, making four in all, but in most concerns the fourth section will combine with the third

(1) Material section

(2) Labour section

(3) Expense and statistics and reports section

We will now proceed to examine the detailed routine of each

### **Material Section**

The work in connection with the various routine forms and records relating to materials is more conveniently arranged according to their respective functions. For instance, all records relating to stocks on hand, such as the Stock Record Card, etc., are usually dealt with separately from the extending and posting of the values, etc., of stores requisitions. The size of the business and the number of stores requisitions, etc., that have to be dealt with each day will naturally decide the actual routine that will be used and the number of staff necessary, but whether the business requires one or six clerks to cope with the volume of work need not enter into the present consideration, as the following details will be related to the nature of the work to be done rather than the staff required

The consideration of materials in connection with a

costing system was dealt with in Chapter III under the main heads of Receiving and Storing, Issues from Stores, and Recording in Costs, and as most of the clerical operations necessary in each case have already been detailed, we shall now only be concerned with the several matters which may be more appropriately regarded as purely internal routine in the cost department

The duties of clerks solely engaged upon the writing up of the Stock Record Cards will chiefly consist of—

(1) Posting particulars of all goods received in the stores from the record of goods received

(2) Posting particulars of all goods issued against stores requisitions

(3) Checking and comparing the Stock Record Cards with the actual quantities of goods in stock and the Bin Cards, as noted on the Record of Bin Inspection

The work of recording all goods received can only be done when the copy of the Goods Received Book is handed into the office once each day, therefore, in cases where a large number of consignments are received, there is generally provided a separate slip or note for each consignment

Under these circumstances it will be the practice to send all the goods received slips or notes to the cost department at frequent periods throughout the day

The entries from the above are made on the stock record card according to the method described in Chapter III, and the Goods Received Sheet or Note is then dealt with according to routine, i.e. either filed in order of date or serial number in the cost department, or sent to the buying or accounts department for checking the Purchase Invoice

The handling of the stores requisitions by the stock record clerk was fully explained in Chapter III, and after the price of the material has been inserted thereon, the requisition is passed on to the clerks, who will extend the values and, finally, post the amount direct to the Cost



storekeeper's assistants have omitted to enter one or more of the issues. If there is still a discrepancy (after checking and correcting the entries where necessary), it is desirable that the contents of the bin (or bins) be again counted. Any difference will now be corrected, and if an alteration in the Stock Record Card and Bin Card is necessitated, the value of such difference or alteration is inserted by the stock record clerk in the appropriate columns of Form No. 21.

Any corrections of the stock records will necessitate adjusting the Stock Control Account, and this is usually done once each month by taking the total of both the plus and minus columns and preparing a journal entry to transfer the respective amounts to the Store Losses and Shrinkage Account. The actual posting of the Journal Entry will not be done by the stock record clerk, as it will be found more convenient if the ledger containing all the Control Accounts is kept by the Statistical Section, and the Journal entries dealt with by that section.

If a large number of requisitions have to be dealt with, the clerk responsible for the extensions and additions, etc., is usually provided with a mechanical calculating machine, which will also be available for summarizing all the issues for the week or month.

As previously mentioned, the treatment of the stores requisitions will depend upon the number received each day. Where only a comparatively small number have to be posted at a time, this can quite conveniently be done by checking each requisition and posting the amount to its respective account. The requisitions, after they have been extended and checked in the first place, are sorted according to job numbers, in order to facilitate the work of posting.

When a large number of works orders are passing through the factory, the number of requisitions that have to be dealt with will be so great that a more speedy and economical

method has to be adopted, and in this direction it is as well to note that the summarizing of the material cost of each order is more often deferred until the order is completed. In such cases the stores requisitions are sorted and filed under job numbers during the period that the work is in progress.

Upon the cost department being notified each day that certain orders are completed, the requisitions are taken out of the file and summarized upon a materials collecting sheet, or totalled by the aid of a mechanical adding and listing machine, and the values then posted in the usual way to the accounts in the Cost Ledger.

With the above method in use, it becomes necessary to summarize all requisitions for the week in order that the value of materials issued is obtained for the purpose of crediting the Stores Control Account. This work must therefore be done before the stores requisitions are sorted and filed under their respective job numbers, and the final summary can be very easily and quickly prepared by passing the requisitions through the mechanical adding and listing machine.

From the figures so obtained a journal entry is made out and is passed on to the Statistical Section for posting in the Cost Ledger, together with the original summary.

The values of materials having been ascertained and posted to the job, process or standing order, there only remains the completion of the materials summary for each order as the final step in this section of the cost department.

### **Labour Section.**

The work in the Labour Section of the cost department must of necessity be arranged to meet the needs of the pay-week period, and the detailed routine given in Chapter IV regarding the issue of Gate Cards will clearly indicate the nature of the work that may be said to commence the week's activities.

### Engagement of Workers.

Upon the engagement of a worker, the Wages Section will require a record of each man's name and the rate at which he is to be paid, so that they will have all information necessary for the issue of the Gate Cards. A record of employees is usually kept on the card system, and all the cards relating to each department filed together in the order of name or clock number. If, therefore, a worker should be transferred from one department to another, it will then be an easy matter for his card to be removed and placed amongst those relating to his new department. The employee's record card is ruled to accommodate full particulars, such as name and address, age, previous employers, trade, etc. The commencing rate of pay must also be shown and sufficient space provided so that any increases granted from time to time can be recorded.

As and when an employee leaves the services of the company, his record card is removed and filed separately. These record cards are generally used as the medium for preparing all the Gate Cards each week, and to guard against errors in rates of pay, etc., the Gate Cards are checked before being placed in the card racks. The writing up of the pay roll will also be done from this same record, the work being usually performed mid-week, as the wages clerk will be fully occupied towards the end of the pay week in calculating and checking the details of each man's pay. The writing up of the pay roll will only consist in the first instance of inserting the worker's clock number, name and rate, as the remaining columns cannot be filled in until after the calculation of each worker's time has been completed.

The issue of the Job Cards will usually be done by the planning, progress, or other works department, and the wages clerks will not generally be concerned with these until each man has completed his task, and the card is sent in to the office. As and when the Job Cards are received, therefore, the calculations of the piece work or



bonus earnings will be completed and the cards temporarily filed under order of clock number or worker's name pending receipt of the Gate Cards, so that all the cards relating to each workman will be in the correct order for comparing with the Gate Cards when received at the end of the pay week. It will be remembered that the back of the Gate Card (Form No 9) was ruled, so that each Job Card could be entered thereon and the total hours summarized.

This summarizing of the Job Cards is only the first step towards agreement with the Gate Cards. The total number of hours as now shown by this summary will agree only in a very few instances, as it will readily be seen that all work on the respective orders will not be completed at, say, 5 o'clock on the Wednesday evening. It is, therefore, necessary to ascertain the number of hours each worker has booked to "jobs in hand," i.e. both production orders and standing orders. The actual checking in this direction will depend upon the routine in each factory, as in some instances it is the practice for the gate-keeper to make out a list of all the Job Cards in the racks, quoting the clock number, order number, also time and date each job was commenced, whereas in other cases the wages clerk will go to the card racks, and refer to each Job Card, noting the order number and time commenced, etc., which he afterwards inserts upon the back of the Gate Card. In the majority of cases the total number of hours spent on the various production orders, etc., will agree with the number stated on the Gate Card. The calculations will therefore be completed and the amount of piece work or bonus earnings added and the total pay arrived at. Certain cards, however, may still show a difference, and the foreman of the men concerned should investigate the figures on the few remaining cards with a view to confirming any errors in booking of time, etc.

It is the general practice for the gate-keeper or time clerk to prepare a list of all absentees each morning and midday

by listing all the Gate Cards remaining in the "out" rack at a stated time after the men have "clocked in." These lists are sent to the Wages Section and checked with the Gate Cards before writing up the pay roll.

It has already been stated that if each worker is provided with continuity of work all the Job Cards for the week, when added together, will agree with the Gate Card, but as there will usually be a certain amount of time lost in changing over from one job to another, or for the other reasons as mentioned in Chapter VI, page 78, each worker will have clocked on to a standing works order number when delayed in commencing or completing his next task. When agreeing the total times, as mentioned above, one will therefore have Job Cards which relate to both works orders and standing orders.

Having agreed the times shown on the cards, the pay roll can now be completed, and the amounts entered in the remaining columns, the pages added, and a final total ascertained. The actual making up of the money into tins or envelopes will not be done by the wages clerks, but the pay roll passed on to the cashier as described in Chapter IV.

It may be well to note that when the Job Cards were compared with the Gate Cards there was in almost every case a "carry over" of time on jobs in progress. In order to facilitate the work for the ensuing pay week, it is a very good plan to insert on the back of the new week's Gate Card the order number and number of hours which have been credited to the previous week. If this is done, it will not be necessary to refer again to the Gate Cards of the previous week.

With those concerns which employ a large number of workers the pay roll will invariably be arranged according to departments, and to ensure that the Wages Section are notified whenever a worker is transferred from one department to another, or when a change is made in clock number or occupation, a "Transfer Note" is made out, containing

particulars of the transfer or new clock number, etc. Form No 22 is a specimen of such a form, and on its receipt by the wages clerk, the necessary alterations on the employee's

*Form No 22*

## WORKER'S TRANSFER

*Date*

*To Mr* *Department*

Please confirm your agreement to transference of  
from this department to
Clock No
Trade  
department

Remarks

			<i>Foreman</i>
RECEIVING FOREMAN			Transfer Approved by
Signature	Worker's Trade	Clock No	
			<i>Works Manager</i>

### NOTE TO RECEIVING FOREMAN—

If accepted in a trade different from above, state in what capacity worker will be employed

*This Form must be sent to Wages Department immediately Works Manager's approval is obtained*

*Size of Form 5" x 4" deep*

record card will be made, and a fresh Gate Card issued should the change require it

Various records will now be compiled by the wages clerks in connection with the information contained on

the pay roll and Gate Cards, the more general being as follows—

### **Employees' Weekly Pay Record**

All classes of manual workers are assessed for income tax upon a quarterly basis, and it is compulsory for all firms to make a return showing the total earnings of each employee over the standard amount

To facilitate the compilation of this return a Record Card similar to Form No 23 is used, and the gross earnings entered each week either direct from the Gate Cards or the pay roll

With the large manufacturing concern there will usually be an employment department, whose chief duty is to ensure that a regular supply of the right type of labour is always available, and in such instances the Wages Section will have a separate record of the rates of pay for each workman, as the employment department will retain the employee's record card

The rulings of "Rate Cards" are very simple, as they will usually have the employee's name, address, age, clock number and trade at the top of the form, and columns to note the commencing and subsequent rates of pay

When separate Rate Cards are used, they will be the medium for issuing the Gate Cards and the checking of rates, etc., in place of the employee's Record Card

### **Compiling Labour Costs**

The routine in connection with the summarizing and posting of the amounts of wages and number of hours on each job will be similar to that described for the stores requisitions

After completing the checking of the Gate Cards the Job Cards are passed on to the clerks who will be responsible for compiling the labour cost of each works order, and the routine in connection with the summarizing and posting

Form No 23

## EMPLOYEE'S WEEKLY PAY RECORD

Check No

Employee's Name

Department

Address

Trade

FIRST QUARTER			SECOND QUARTER			THIRD QUARTER			FOURTH QUARTER		
Week Ending	£	s d	Week Ending	£	s d	Week Ending	£	s d	Week Ending	£	s d
1			14			27			40		
2			15			28			41		
3			16			29			42		
4			17			30			43		
5			18			31			44		
6			19			32			45		
7			20			33			46		
8			21			34			47		
9			22			35			48		
10			23			36			49		
11			24			37			50		
12			25			38			51		
13			26			39			52		
Total 1st Quarter, £			Total 2nd Quarter, £			Total 3rd Quarter, £			Total 4th Quarter, £		

Card No

TOTAL FOR YEAR ENDING

19

£

Size of Card 8" x 5"

of the wages and number of hours to each Cost Account will be similar to that described for materials, the Job Cards being filed until the work is completed or posted from day to day direct to the account in the Job Cost Ledger

In those cases where the Job Cards have to be filed until the order is completed, it will firstly be necessary to write up the several statistical records that are prepared from the details shown on the Job Cards before the cards are sorted and filed under their respective order numbers

### **Record of Bonus and Piece Work Earnings**

A record of bonus and piece work earnings will be required, and for this purpose a card is used similar to Form No 24. A separate card is allocated to each article or to every single operation on such article. The information is obtained from the respective Job Cards and the name of the operator, rate, quantity passed and rejected, and rate of bonus earned is recorded.

These records enable the cost department to notify the planning or other works department of any abnormal earnings so that the matter can be investigated, and the necessary steps taken. Any alterations or modification following an investigation are noted in the remarks column, so that the cards will contain a complete history of any changes made either in the rates of pay or method of manufacture.

### **Expense and Statistical Section**

The work entailed in regard to the collection, allocation, and recovery of expenses as described in Chapters V and VI will practically cover most of the routine of this section. There remains only the detailed work of posting the journal entries, which will have been received from the Materials and Labour Sections, to complete the Control Accounts in the Cost Ledger, also the final summarizing of the complete cost of a job, order, or process.

Form No 24

## RECORD OF BONUS OR PIECE WORK EARNINGS

Name of Component or Article

[illegible]

Size of Card 8" x 5"





The posting of the entries recording the movement of all materials, the use of labour, and the amount of expenses absorbed by the various jobs completed has already been dealt with very fully, so that attention need only be given to the more general subsidiary records prepared by this section

The quantity and nature of statistical returns required by each business vary to such an extent that it is impossible to give a description of the forms that are to be found in practice, as their ruling differs in each case, furthermore, the work in connection with Costing Statistics, etc., is of such an advanced character that it would be entirely out of place to deal with them in an elementary work

The final summarizing of a total cost will usually be done on a form specially ruled for the purpose, similarly to Forms Nos 13, 14, and 15, and from these summaries various records are compiled. In those businesses, such as engineering, for instance, where the final product made is assembled from a series of parts or components, there is required a record of the costs of each part or component, which will serve two purposes. Firstly, it gives the figures for pricing the components or parts used on an assembly order, and, secondly, provides the basis of comparing the detailed costs of each quantity made at different periods

A specimen Comparative Cost Card, Form No 25, is given, a separate card being used for each article

With some industries it is necessary to show an analysis of the labour cost per article, so that any variations on each operation can be brought to the notice of the departments concerned, and the causes as to excessive or questionable costs noted in the remarks column. In an engineering works the record may show the analysis of labour under the headings of turning, fitting, milling, drilling, etc

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